EXHIBIT – I
SCOPE OF WORK

1. DESCRIPTION OF WORK – GENERAL

Except as otherwise expressly provided elsewhere in this Contract, CONTRACTOR shall provide all labor, supervision, material, equipment and inspection, prepare record books, furnish all materials, transportation, freight forwarding, customs clearance, material receiving and handling, warehousing services, utilities, supplies, tools, construction equipment, temporary facilities and each and every item of expense necessary for the **Fixed Equipment Package -Maintenance and Inspection of Drums, Exchangers, Furnaces and Miscellaneous works (PRD's, Control Valves / Transmitter, Piping Cold works, Pipe cleaning & Hot work, Blinding) during TA 2024 JCP EBSM** at the COMPANY facility in Jubail Industrial City.

SECTION – A

GENERAL TERMS &CONDITIONS

Terms & Conditions

The Scope of work described in this document shall be executed in accordance with the following.

terms and conditions wherever it applicable to the subject job: In this section Contractor's &

COMPANY's responsibilities have been divided.

CONTRACTOR shall provide Manpower loading chart and equipment loading chart separately for Fixed equipment package EBSM Exhibit I and shall not combine with Manpower loading chart and equipment loading chart of Catalyst change Exhibit I. Overall Project Manager can be combined as one for Catalyst change Exhibit I and Fixed equipment package EBSM Exhibit I.

1.1 CONTRACTOR's responsibilities:

Terms & conditions with respect to contractor's responsibilities have been listed in below documents under different sub-heads.

CONTRACTOR's responsibilities include, but are not limited to the following:

General Terms & Conditions:

1.1.1 CONTRACTOR shall perform safe and timely execution of all work activities described in" CONTRACTOR's Scope".

1.1.2 Work performed by CONTRACTOR will be under the direction of COMPANY supervision. As necessary, additional support or direction can be obtained from the Area Supervisor-in-charge assigned by COMPANY.

1.1.3 CONTRACTOR shall comply with COMPANY's all General Instructions (GI) and Best Practices related to the scope of work. Copies of COMPANY General Instructions will be provided.

1.1.4 Supplying all qualified labor, supervision, tools, equipment, technical support, consumables, expendables, and temporary supplies necessary for, and reasonably related to complete the scope of work.

1.1.5 Providing necessary cranes, lifting gears, valid test certificates, qualified operator with Saudi license and flag man for marching. Crane Operator should ensure out riggers positioned properly and away from concreate joints/loose soil or any other unsafe locations and get approval from "COMPANY" Maintenance prior to start the job.

1.1.6 Providing necessary consumable and expendable supplies in enough quality and quantity for personnel to perform the scope of work safely and efficiently.

1.1.7 CONTRACTOR will ensure enough communication devices sets available for his team for effective site communication, which will require COMPANY information technology / security approvals to use right communication devices. However, for a "Contractor's "focal person contact, COMPANY may also provide few sets, if available & allowed by the prevailing rules and regulations at that time & if allowed by Govt Rules & Regulations.

1.1.8 CONTRACTOR shall perform the work on both Day & Night Shifts. Each Working Shift shall be of 12 Hours.

1.1.9 Arranging Breathing Apparatus for blinding, Air compressor, Calibrated Pressure Safety Device and Gauges etc. (Verified Breathing air cylinders contain Grade D air and are not filled via synthetic air blending)

1.1.10 Mobilize sufficient number of cranes based on work scope and accordingly to ensure to meet the TA schedule.

1.1.11 If lumpsum jobs get delayed due to non-availability of crane and in such case if COMPANY will provide the required crane to CONTRACTOR, then the cost of crane usage for that period will be back charged to CONTRACTOR.

1.1.12 All the Heavy Equipment, rigging team should have COMPANY approved 3rd party certification and riggers should go through COMPANY's qualification process prior to mobilize.

1.1.13 CONTRACTOR should ensure to have immediate replacement of Crane operator if he is found not meeting company's compliance requirement.

1.1.14 All Vacuum truck hoses must perform the continuity test and have tags placed on it. CONTRACTOR to follow COMPANY GI-1259.

1.1.15 CONTRACTOR shall comply with GI-2219 for Utilities hoses and connection and ensure hoses they bring on site are inspected and

meet COMPANY Standards. The condition of hoses shall be stated on the inspection report with hydrotest report from Third party and inspection reports must accompany the CONTRACTOR when they arrive at site and shall be immediately available for review by COMPANY representative.

1.1.16 CONTRACTOR shall ensure all received hoses, manifolds, Hard piping, Connection are equipped with identification inspection tag and supported with third party test certificate. (Anything found to be non-compliant shall not enter to our facility).

1.1.17 CONTRACTOR to ensure the shift turnover for critical and near critical path Equipment to be done at site.

1.1.18 CONTRACTOR shall follow COMPANY Fatigue Policy CP # 1055. CONTRACTOR shall mobilize the personnel under their direction to comply with this policy to ensure personnel physical health without negatively affecting TA schedule or quality.

1.1.19 CONTRACTOR will be responsible for Transport, Food, Tea or Coffee for their staff. Company will allocate the Tent Area for Lunch or Dinner.

Actions required After PO Issuance:

1.1.20 CONTRACTOR will arrange receipt and transfer of all non-consumable material from the “COMPANY” T/A Warehouse to the work location. CONTRACTOR will return the balance of unused and undamaged material to the T/A warehouse after completion of work.

1.1.21 Provide forklifts and qualified forklift operators holding valid Saudi driving license. Forklift operators are required to attend “COMPANY” Powered Industrial Truck (PIT) training per “COMPANY” General Instruction. CONTRACTOR will schedule personnel for pre-T/A PIT training at the request and timing specified by “COMPANY” T/A management. Forklift truck will also require the flag man.

1.1.22 All tools, equipment, and resources are subject to initial and periodic inspection by “COMPANY” personnel to ensure safe and compliant use within the “COMPANY” facility. “COMPANY” reserves the right to reject use of any tool(s) or equipment for cause. Tool container shall be provided by CONTRACTOR.

1.1.23 Submit the Organization chart, defined by craft and name, all personnel required to execute and supervise the scope of work, 45 days in advance of the T/A start date as defined by “COMPANY” T/A management. CONTRACTOR will schedule personnel for required pre-T/A training at the request and timing specified by “COMPANY” T/A management and “COMPANY” Safety.

1.1.24 CONTRACTOR shall send their Admin Co-coordinator (Arabic) for coordination with COMPANY'S Admin & Security Department for preparation of ID's etc., as and when required.

1.1.25 CONTRACTOR will get approved Torque value charts equipment wise from COMPANY reliability and provide copy to TA Planning during planning phase, FORTY-FIVE (45) days prior to turnaround.

1.1.26 After issuance of PO, CONTRACTOR will be responsible to submit project manager & planning team names who will be involved with "COMPANY'S TA planning team for joint site visits & any exchange of information. CONTRACTOR'S planning team will be responsible for submitting the Lifting plans, method statements during Planning phase.

Scope Specific Terms & Conditions:

1.1.27 Provide portable air compressors and certified hoses along with relevant crews.

1.1.28 CONTRACTOR shall have enough 24" air blowers / Saddle ventilation and sufficient air compressors to ventilate the equipment from each manway.

1.1.29 Provide hydro jetting machines with crews up to 20000 Psi capacities. Operating pressure beyond 3000 Psi will require approval from reliability also.

1.1.30 CONTRACTOR shall perform Hot work like cutting and welding including NDT (DPT, Hydrotest, RT) for the piping jobs as specified in the scope of work below item 2.10.

1.1.31 CONTRACTOR shall have vacuum truck for sludge removal & any hydro jetting water residual which cannot be gravity drained & require vacuum truck and all Vacuum truck hoses must perform the continuity test and have tags placed on it. CONTRACTOR to follow COMPANY GI-1259.

1.1.32 Provide Exchanger bundle puller along with relevant qualified crews.

1.1.33 CONTRACTOR should arrange to shift Exchanger tube bundle to cleaning pad as per specified location for Hydro jetting and cleaning and vice versa to site after cleaning for installation.

1.1.34 CONTRACTOR shall provide vacuum trucks and catch basin / skip to collect the hydro jetting water for E-3303 & E-3304 and D-3302 during hydro jetting activities.

1.1.35 All NDT Inspections like Eddy current or IRIS etc. as mentioned scope and get verification of work quality and final approval of cleaning & repair work from COMPANY reliability.

1.1.36 CONTRACTOR shall ensure the provision of enough torquing crews and Torquing machine, nut splitters etc. for parallel jobs to avoid any delay because of resource deficiency.

1.1.37 In case while hydro jetting inside equipment produces LEL, BA may be required, contractor to have stand by BA accordingly.

1.1.38 CONTRACTOR will prepare the equipment for inspection up to the satisfaction level of COMPANY reliability, will coordinate with COMPANY reliability for inspection and will repair in accordance with the COMPANY reliability's recommendation.

1.1.39 All necessary cleaning tools, “COMPANY” approved sprays & chemicals would be CONTRACTOR’S responsibility.
1.1.40 To perform any type of buffing work for lifting lugs and equipment NDT (DPT / UT / MPT) inspection requirements as recommended by COMPANY reliability & inspection team.
1.1.41 CONTRACTOR will transport demister pad, drum internals, vessel internals / Equipment parts (Exchangers / PRD / Control valves/ filters / Piping) to & from the designated area for cleaning.
1.1.42 CONTRACTOR to have RC (royal commission) approved own trailers / Vacuum Trucks. CONTRACTOR shall make arrangement for dispose the Sludge / wastewater during hydro jetting to the disposal area outside of COMPANY facilities / inside COMPANY facility as per recommendation from COMPANY EHS by providing trailers / trucks with driver and flagman.
1.1.43 Where there would be a requirement of cleaning on site, special safety arrangements & barricades and warning boards will be installed by CONTRACTOR as per equipment & plant location.
1.1.44 CONTRACTOR will ensure the provision of enough torquing crews and Torquing machine, nut splitters etc. for parallel jobs to avoid any delay because of resource deficiency.
1.1.45 Guarantee against defective workmanship shall be for the period of 2 weeks from the state of start-up.
1.1.46 Any deletion after award of PO, if deleted job information is conveyed before mobilization or 1 month before TA it shall not be charged.
1.1.47 All Inspections and get verification of work quality and final approval of cleaning & repair work.
1.1.48 Special precautions have to be taken to avoid water usage where no hydro blasting or water cleaning is required. Only manual cleaning would be done. Special Alerts would be placed by CONTRACTOR on such jobs.
1.1.49 Common blinds will be held till all parties finish the work their area.
1.1.50 Follow the blind list and blind specification specified by COMPANY. Any deviation requires COMPANY approval like using less blind thickness.
1.1.51 CONTRACTOR will be responsible for all site coordination with Planning, Operation, Process & reliability as & when necessary to make sure that there is no lag time in between activities.
1.1.52 In Case, if there are multiple contractors to work on the same equipment in between its own activity, CONTRACTOR will be responsible to ensure effective communication and follow up with that CONTRACTOR to ensure that no unnecessary lag occur in this transition.
1.1.53 CONTRACTOR will get the final box up certificate after completion of all activities. All this box up certificates will be handed over to TA planning.
1.1.54 Inspection of Demister pad, Spares parts and Gaskets to ensure fit and finish per Drawings, and that meet SOW requirements. This

activity shall be done in advance of T.A. at the request and timing specified by COMPANY.

1.1.55 Engineering Lift Plan (refer GI 1238) must be submitted 120 days in advance to T.A. for 3rd party approval and necessary preparation works.

1.1.56 All tools, equipment, and resources are subject to initial and periodic inspection by COMPANY personnel to ensure safe and compliant use within the COMPANY facility. COMPANY reserves the right to reject use of any tool(s) or equipment for cause.

1.1.57 CONTRACTOR will be responsible for all PPEs for his manpower and PPE like disposal coveralls etc. to protect from NORMs for equipment's maintenance and follow safe disposal of NORM PPE into COMPANY designated bin / area.

1.1.58 **CONTRACTOR shall ensure to dedicate a group for Control Valves to support instrument team.**

1.1.59 CONTRACTOR shall submit / handover the QA/QC dossier after Turnaround completion.

Safety:

1.1.60 Providing full time Safety personnel whose sole responsibility shall be to ensure CONTRACTOR personnel conduct work in accordance with Rules and Regulations of "COMPANY", and that good safe work practices are utilized at all times.

1.1.61 Performing work in accordance with "COMPANY" Safety procedures and requirements outlined in the "COMPANY" T/A EH&S Plan and compliance to all "COMPANY" General Instructions (GI). Copies of "COMPANY" General Instructions will be provided.

1.1.62 CONTRACTOR shall provide a well-trained & certified Permit receiver, Hole watch, fire watch & bottle watch.

1.1.63 CONTRACTOR will be responsible for all PPEs for his manpower and PPE like disposal coveralls etc. to protect from NORMs for equipment's maintenance and follow safe disposal of NORM PPE into COMPANY designated bin / area.

1.1.64 CONTRACTOR shall follow COMPANY Fatigue Policy CP # 1055. CONTRACTOR shall mobilize the personnel under their direction to comply with this policy to ensure personnel physical health without negatively affecting TA schedule or quality.

1.1.65 Safety officer's final acceptance will be after face-to-face interview with "COMPANY" safety department.

Planning & monitoring

1.1.66 Visiting the job site to acquaint themselves with existing conditions.

1.1.67 CONTRACTOR'S Site management staff, Equipment and Leadership team like Supervisors/Foremen/Leads, Lead Planner QA/QC, etc. shall comply to the "COMPANY" plan for early mobilization as specified for necessary preparation work to understand the job, for site orientation, Crew's planning as per P6 schedule , JSA's , detailed

assessment of work requirements , equipment & staff certifications and for setting up agreed temporary installations. CONTRACTOR shall mobilize the before mentioned craft at least by Fifteen (15) days ahead of start of S/D start date unless approved by TA Planning Superintendent or TA Manager and communicated by contracts department.

1.1.68 Prestaging activity to be started 4 weeks in advance.

1.1.69 CONTRACTOR will submit daily progress report to TA planning, highlighting the work activities of the day, next day plan, equipment & manpower count, HSE statistics of the site. CONTRACTOR will also issue daily work schedule based on two shifts of 12 hours each.

1.1.70 CONTRACTOR shall provide the On-Site Peak load & Org Chart with their technical manpower also on daily progress report.

1.1.71 At the end of the TA activity, a detailed report shall be submitted to COMPANY by CONTRACTOR. CONTRACTOR's Final invoices will be approved on submission of consolidated dossier of NDT reports & Activity Report along with lesson learnt.

1.1.72 CONTRACTOR to provide maintenance progress updates and manpower count to COMPANY during each shift.

1.1.73 CONTRACTOR Shall ensure the shift relieving to be done at job site for critical path equipment's.

Handling of Additional & Discovery Work

1.1.74 CONTRACTOR to mobilize sufficient resources like Pipefitters to work as Valve turners, manpower, tools & equipment to support operations "COMPANY" maintenance group for Shutdown and Start up activities till Feed In. Manpower mobilization for this crew shall be applicable as part of lumpsum cost and will be applicable from Shutdown start date. However, for any early support activity for operations, contractor will ensure early mobilization of the required crafts & resources as demanded. Operation support requirements for Shutdown period and before or after Shutdown period will be evaluated in Pre-TA phase. Any Additional support outside the TA window will be paid separately on Day rate Basis.

1.1.75 For any additional work, please provide us unit rates for manpower craft wise and for all the Equipment's like cranes, lift trucks, hydro jetting m/c, pressure testing pumps, bundle pullers etc.

1.1.76 Any discovery work shall be invoiced separately and shall be based on "COMPANY" approved CMF (Change Management Form).

Restricted Access - Avoid Unnecessary Movement

1.1.77 Advising and warning CONTRACTOR personnel that Operations Central Control Rooms and other Operations Structures within the "COMPANY" facility are not to be entered or accessed FOR ANY REASON without operations approval and escort. Any unescorted CONTRACTOR found inside a Central Control Room or other

Operations Structure is subject to removal and banishment from the "COMPANY" work site.

1.1.78 Advising and warning CONTRACTOR personnel that the Central Maintenance Shops and Maintenance Structures within the "COMPANY" facility are not to be entered or accessed FOR ANY REASON without maintenance approval and escort. Any unescorted CONTRACTOR found inside a Maintenance Shop or other Maintenance Structure is subject to removal and banishment from the "COMPANY" work site.

1.1.79 CONTRACTOR shall ensure presence of their personnel to the designated work area only. Any Person found in or around unrelated plant area, shall be subject to immediate removal from Plant. CONTRACTOR shall provide a suitable replacement immediately to avoid any effect on work progress.

House Keeping

1.1.80 Maintaining a job site that is always clean and free of debris. After completion of work, leave the area as clean as found.

1.1.81 Discarding all coke, sludge, damaged parts, packing/ scrap metals, and all other general rubbish from maintenance activities into designated waste containers provided by COMPANY. The CONTRACTOR shall make arrangements to shift waste containers to temporary waste storage areas designated by COMPANY.

1.1.82 Maintaining a job site that is always clean and free of debris. After completion of work, leave the area as clean as found.

1.2 **COMPANY:**

1.2.1 Isolation and Decontamination of Equipment/system.

1.2.2 Electrical & Instrument disconnections and reconnections.

1.2.3 Battery limit or common blinding which are common with other contractors.

1.2.4 Any Insulation & Refractory removal, repair or Installation activity

1.2.5 All sort of Painting work.

1.2.6 Exchanger tube rupture and plugging shall be performed using pop a plug.

1.2.7 Exchanger tube rolling / pulling / Plugging.

1.2.8 Any welding activity which is not specified in Scope of work.

1.2.9 Erection of all scaffolds and revisions as required by CONTRACTOR.

1.2.10 Provide drawings, blinds, gaskets, spares or any other materials and consumables required for facilitate the subject job.

1.2.11 Provide utilities such as water, lights for internal and external use, Scaffolding, Insulation and any type of welding works recommended by Inspection team which is not specified in scope.

1.2.12 Office facilities for CONTRACTOR (as decided by COMPANY T/A management, either Blast Resistant Module for essential on-site personnel, or workspace in the T/A office for non-essential personnel)
1.2.13 Verification of All NDT Inspections, verification of work, quality and final approval of cleaning & repair work.
1.2.14 Tent with tables and chairs for CONTRACTOR lunch and rest break
1.2.15 Prayer facilities in designated work locations.
1.2.16 Drinking water around the clock.
1.2.17 All temporary lighting for confined space entry (required by GI, Class-1 Div-1)
1.2.18 All EHS meters and monitors required by General Instruction and will be provided by COMPANY
1.2.19 Rest Shelters in designated work locations
1.2.20 Smoke Shelters in designated work locations
1.2.21 Sanitary facilities (toilets and hand wash stations)
1.2.22 All non-consumable material required to perform the scope of work.
1.2.23 Inspection of work performed by CONTRACTOR.
1.2.24 Making Equipment's ready to blind.
1.2.25 COMPANY will provide manifest for the disposal of any spent catalyst.
1.2.26 Conduct BSO Course and required courses for Permit Receiver (as required).
1.2.27 Issuance of ID cards and Vehicle stickers.
1.2.28 Issuance of material gate passes.
1.2.29 Issuance of Work Permits.

SECTION- B
SCOPE OF WORK

2. DESCRIPTION OF WORK-SPECIFIC:

2.1 **DRUM SCOPE OF WORK:**

Inspection and Cleaning of Drum internals and any internal replacement as per specified in detailed scope given below, but are not limited to the following:

UNIT 32

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**D-3201 ALKYLATOR OVERHEAD DRUM**	

	➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
2	**D-3202 BENZENE COLUMN OVERHEAD DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS.

	APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
3	**D-3204 EB COLUMN OVERHEAD DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED

	➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ METALLIZED THERMAL SPRAY COATING / WELD METAL BUILDUP. ➢ WELDING ACTIVITIES.
4	**D-3205 PEB COLUMN OVERHEAD DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ METALLIZED THERMAL SPRAY COATING / WELD METAL BUILDUP. ➢ WELDING ACTIVITIES.

	NOZZLE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
5	**D-3207 VACUUM DRUM** ***** 8" HAND HOLES **** NO MAN ENTRY ***** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND / REMOVE SPOOL AS PER OPERATION BLIND LIST. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN HAND HOLE AND ARRANGE LIGHTING FOR INTERNAL INSEPCTION. ➢ REMOVE, HYDRO JET CLEAN, INSPECT AND INSTALL DIP PIPE. ➢ PERFORM INITIAL INSPECTION BY PROCESS ENGINERING / RELAIBILITY. ➢ HYDRO BLAST CLEAN / WASH DRUM INTERNASL, ALL NOZZLES AND INSTRUMENTS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT / LG AND ALL COMPONENTS. ➢ POST CLEANING INSPECTION BY PROCESS / RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ OFFER FOR FINAL INSPECTION BY RELIBAILITY AND PROCESS ENGINEERING. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP DRUM HAND HOLE AND TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ METALLIZED THERMAL SPRAY COATING / WELD METAL BUILDUP. ➢ WELDING ACTIVITIES.

6	**D-3208 TRANSALKYLATOR HEATER CONDENSATE POT** ***** 8" HAND HOLES **** NO MAN ENTRY ***** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND / REMOVE SPOOL AS PER OPERATION BLIND LIST. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN HAND HOLE AND ARRANGE LIGHTING FOR INTERNAL INSEPCTION. ➢ PERFORM INITIAL INSPECTION BY PROCESS ENGINERING / RELAIBILITY. ➢ HYDRO BLAST CLEAN / WASH DRUM INTERNASL, ALL NOZZLES AND INSTRUMENTS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT / LG AND ALL COMPONENTS. ➢ POST CLEANING INSPECTION BY PROCESS / RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ OFFER FOR FINAL INSPECTION BY RELIBAILITY AND PROCESS ENGINEERING. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP DRUM HAND HOLE AND TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ METALLIZED THERMAL SPRAY COATING / WELD METAL BUILDUP. ➢ WELDING ACTIVITIES.
7	**D-3209 BENZENE COLUMN REBOILER CONDENSATE POT** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS.

	UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA AND INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
8	**D-3210 FINISHING REACTOR HEATER CONDENSATE POT** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA AND INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS.

	➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
9	**D-3212 PEB COLUMN REBOILER CONDENSATE POT** ***** 6" HAND HOLES **** NO MAN ENTRY ***** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND / REMOVE SPOOL AS PER OPERATION BLIND LIST. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN HAND HOLE AND ARRANGE LIGHTING FOR INTERNAL INSEPCTION. ➢ REMOVE, HYDRO JET CLEAN, INSPECT AND INSTALL DIP PIPE. ➢ PERFORM INITIAL INSPECTION BY PROCESS ENGINERING / RELAIBILITY. ➢ HYDRO BLAST CLEAN / WASH DRUM INTERNASL, ALL NOZZLES AND INSTRUMENTS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT / LG AND ALL COMPONENTS. ➢ POST CLEANING INSPECTION BY PROCESS / RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ OFFER FOR FINAL INSPECTION BY RELIBAILITY AND PROCESS ENGINEERING. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP DRUM HAND HOLE AND TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	

UNIT 33

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**D-3301 SI DRUM** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ REMOVE DEMISTER PAD AND OFFER FOR INSPECTION. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ INSTALL NEW DEMISTER PAD. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
2	**D-3302 DM//WATER SEPARATOR** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ OPEN INTERNAL BOTTOM HAND HOLE. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, BAFFLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ HYDROJET CLEAN / VACUUM THE OTHER SIDE OF BAFFLE. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ BOX UP INTERNAL BOTTOM HAND HOLE. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	COMMISSIONING. **NOTE:** • **CONTRACTOR SHALL ARRANGE CATCH BASIN / SKIP TO COLLECT THE HYDROJETTING WATER.** • **RC APPROVED CONTRACTOR VACUUM TRUCK SHALL BE AVAILABLE AND WILL BE USED DURING HYDROJETTING. THEREFORE, CONTRACTOR SHALL HAVE VACUUM TRUCKS FOR COLLECTION AND DISPOSAL OF HYDROJETTING WATER. BASED ON SAMPLE AND AS PER OPERATIONS WILL BE DECEIDED WHETHER TO DISPOSE INSIDE S-CHEM OR OUTSIDE FACILITY DURING TURNAROUND EXECUTION**.	
3	**D-3303 SKIMMING TANK** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, BAFFLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
4	**D-3304 OG COMP. SUCTION DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS, DIP NOZZLE AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON BOTTOM NOZZLE ELBOW AND PIPE. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
5	**D-3305 OFF GAS RELIEF DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS, DIP NOZZLE AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON BOTTOM NOZZLE ELBOW AND PIPE. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
6	**D-3307 OFF GAS SEAL DRUM** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS, DIP PIPE AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, BAFFLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
7	**D-3308 EB VAPOURIZER CONDENSATE POT** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM

	GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS, AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON BOTTOM NOZZLE ELBOW AND PIPE. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
8	**D-3309 HP CONDENSATE 2ND STAGE FLASH DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST,	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	(SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS, AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON BOTTOM NOZZLE ELBOW AND PIPE ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
9	**D-3310 CONDENSATE RECEIVER** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
10	**D-3311 HP CONDENSATE FIRST STAGE FLASH DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL

	➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO JET CLEAN INTERNALS, AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON BOTTOM NOZZLE ELBOW AND PIPE ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
11	**D-3312 CONDENSATE DEAERATOR** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS

	➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ **BOTTOM DRUM-** HYDRO JET CLEAN INTERNALS, NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA FOR BOTTOM DRUM. ➢ **TOP DRUM-** REMOVE, CLEAN, INSPECT AND REINSTAL SPRAY NOZZLE. REPLACE SPRAY NOZZLE AS RECOMMENDED BY RELAIBILITY. ➢ **TOP DRUM-** HYDRO JET CLEAN INTERNALS, TRAYS, ALL NOZZLES, INSTRUMENT LEVEL GLAS TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
12	**D-3314 ATMOSHERIC BLOWDOWN STANDPIPE** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. HYDRO JET CLEAN INTERNALS, INTERNAL	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION,

	COILS, INCLUDING ALL NOZZLES, GASKET SEATING AREA AND INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
13	**D-3351 EB/SM SPLITTER OVER HEAD DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM BOOT & NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
14	**D-3352 VAC. SYS. DRUM** ➢ NSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ REMOVE, HYDRO JET CLEAN, INSPECT AND INSTALL DIP PIPE. ➢ HYDRO BLAST CLEAN INTERNALS, DIP PIPE AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, BAFFLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

	CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	
15	**D-3353 EB RECOVERY COLUMN OVERHEAD DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM BOOT & NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

16	**D-3355 SM COL. OH DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
17	**D-3356 WIPED FILM EVAPORATOR DRUM** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS.

	➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN HAND HOLES. ➢ EXPANSION JOINT SHOULD BE LOCKED AND SECURED BEFORE REMOVAL. ➢ REMOVE/DROP EXPANSION JOINT AND BOTTOM CONE. ➢ INITIAL INSPECTION BY S-CHEM OPERATIONS / PROCESS ENGINEERING. ➢ **HOLD FOR MECHANICAL SEAL REPLACEMENT FOR X-3351 (BY OTHERS- ROTATING GROUP).** ➢ HYDRO BLAST CLEAN INTERNALS AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA, INSTRUMENT TAPS. ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ REINSTATE CONE AND **NEW EXPANSION JOINT.** (AFTER MECHANICAL SEAL REPLACEMENT AND DRUM INTERNAL CLEANING / INSPECTION) ➢ REMOVE LOCK BOLTS OF EXPANSION JOINT AFTER INSTALLATION. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
18	**D-3363 EB/SM PROPYLENE REFRIGERANT RECEIVER** ****DO NOT WET INTERNALS - MANUAL CLEAN ONLY**** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL

	APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ MANUAL CLEAN INTERNALS, DIP PIPE AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. **** DO NOT WET INTERNAL** (WIPE-OUT WITH RAGS ONLY)** ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
19	**D-3364 EB/SM C3R FIRST STAGE SUCTION DRUM** ****DO NOT WET INTERNALS - MANUAL CLEAN ONLY**** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL &

	➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ REMOVE DEMISTER PAD AND OFFER FOR INSPECTION. ➢ MANUAL CLEAN INTERNALS, AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. **** DO NOT WET INTERNAL** (WIPE-OUT WITH RAGS ONLY)** ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ REMOVE, CLEAN, OFFER FOR INSPECTION AND INSTALL, INTERNAL DISTRIBUTOR COMPONENTS. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ INSTALL NEW DEMISTER PAD. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.
20	**D-3365 EB/SM C3R SECOND STAGE SUCTION DRUM** ****DO NOT WET INTERNALS - MANUAL CLEAN ONLY**** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS.

	BLIND LIST FOR ENTRY. ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE DISCONNECTED. ➢ OPEN MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ REMOVE DEMISTER PAD AND OFFER FOR INSPECTION. ➢ MANUAL CLEAN INTERNALS, AND BOTTOM NOZZLE INCLUDING ALL NOZZLES, GASKET SEATING AREA. **** DO NOT WET INTERNAL** (WIPE-OUT WITH RAGS ONLY)** ➢ DROP, CLEAN, INSPECT AND REINSTALL LT, LG. ➢ REMOVE, CLEAN, OFFER FOR INSPECTION AND INSTALL, INTERNAL DISTRIBUTOR COMPONENTS. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE VESSEL BOTTOM NOZZLE INSPECTION. ➢ OPEN SKIRT MANWAYS. INSTALL SADDLE VENTILATION AND VENTILATE UNTIL READY FOR OCCUPANCY. ARRANGE INTERNAL LIGHTING ➢ COORDINATE TO ERECT SCAFFOLDING AND TO REMOVE INSULATION FOR SKIRT PIPING THICKNESS MONITORING BY S-CHEM RELIABILITY. ➢ COORDINATE TO RESTORE INSULATION AND TO REMOVE INTERNAL SCAFFOLDING AS REQUIRED. ➢ CLOSE SKIRT MANWAYS. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ INSTALL NEW DEMISTER PAD. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING & REMOVE INTERNAL LIGHTS. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ ALL INSTRUMENTS, PT, LT, AND LEVEL GLASS APPARATUS TAPS TO BE RE-CONNECTED. ➢ BOX-UP MANWAYS AND APPLY TORQUE. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES.

2.2 **FURNACE SCOPE OF WORK:**

Inspection and Cleaning for Furnace as per specified in detailed scope given below:

UNIT 32

RESPONSIBILITY MATRIX		
SN #	**CONTRACTOR**	**S-CHEM**
1	**F-3201 ALKYLATOR REBOILER** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ OPEN ALL FURNACE MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ COVER THE BURNERS/CASTINGS WITH PLYWOOD BOX. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ **DAMPER INSPECTION AND PM BY OTHERS.** ➢ **HOLD FOR CONVECTION SECTION CLEANING DONE BY OTHER CONTRACTOR.** ➢ MECHANICAL / MANUAL CLEANING SHALL BE CARRIED OUT FOR RADIANT TUBES (USE SS WIRE BRUSH), FIREBOX INTERIOR AND BOTTOM FLOOR/ OUTER TUBES CLEANING AS PER PROCESS ENGINEERING AND OPERATIONS. ➢ BURNER TIPS AND IGNITOR TIPS TO BE DROPPED FOR CLEANING. ➢ CLEAN / INSPECT BURNER & TIPS AND IGNITION TIPS. ➢ OFFER FOR POST CLEANING INSPECTION BY RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / RANDOM UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ***** FOLLOWING INSPECTION SHALL BE DONE BY RELIBILITY FOR WHICH CONTRACTOR SHALL SUPPORT FOR ANY MECHANICAL FIXED SUPPORT LIKE CLEANING, BUFFING, HOLE WATCH, STAND BY MAN ETC. ***** ➢ **VISUAL INSPECTION BY RELIABILTY OF THE FLOOR REFRACTORY, BURNER TILES, WALL CERAMIC FIBER BLANKET AND RADIANT**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ VISUAL INSPECITON, DPT AND UTT. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ REFRACTORY REPAIR WORKS. ➢ CONVECTION SECTION DRY BLAST CLEANING.

	TUBES/TUBE GUIDE, PEEP HOLES. ➢ **INSPECTION BY RELIABILTY FOR CONVECTION SECTION HEADER AND STACK REFRACTORY**. ➢ **REPAIR DAMAGED INSULATION AND REFRACTORY AS PER RELIABILITY RECOMMENDATION, (BY SCHEM).** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ BOX-UP ALL FURNACE MANWAYS AND APPLY TORQUE AS REQUIRED. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	

UNIT 33

RESPONSIBILITY MATRIX		
SN #	**CONTRACTOR**	**S-CHEM**
1	**F-3301 STEAM SUPER HEATER** ➢ INSTALL BLIND FOR STEAMING AND DECONTAMINATION AS PER OPERATION LIST, (SHOULD BE WITH BREATHING APPARATUS AS PER GI). REMOVE END FLANGE FROM VENT. **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ INSTALL BLIND/REMOVE SPOOLS AS PER OPERATION BLIND LIST FOR ENTRY. ➢ OPEN ALL FURNACE MANWAY, FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ COVER THE BURNERS/CASTINGS WITH PLYWOOD BOX. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ **DAMPER INSPECTION AND PM BY OTHERS.** ➢ **HOLD FOR CONVECTION SECTION CLEANING DONE BY OTHER CONTRACTOR.** ➢ MECHANICAL / MANUAL CLEANING SHALL BE CARRIED OUT FOR RADIANT TUBES (USE SS WIRE BRUSH), FIREBOX INTERIOR AND BOTTOM FLOOR/ OUTER TUBES CLEANING AS PER PROCESS ENGINEERING AND OPERATIONS. ➢ CLEAN / INSPECT BURNER & TIPS AND IGNITION TIPS. ➢ OFFER FOR POST CLEANING INSPECTION BY	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ VISUAL INSPECITON, DPT AND UTT. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ REFRACTORY REPAIR WORKS. ➢ CONVECTION SECTION DRY BLAST CLEANING.

	RELLIABILITY AND PROCESS ENGINEERING. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / RANDOM UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ***** FOLLOWING INSPECTION SHALL BE DONE BY RELIBILITY FOR WHICH CONTRACTOR SHALL SUPPORT FOR ANY MECHANICAL FIXED SUPPORT LIKE CLEANING, BUFFING, HOLE WATCH, STAND BY MAN ETC. ***** ➢ **VISUAL INSPECTION BY RELIABILTY FOR THE FLOOR REFRACTORY, BURNER TILES, WALL CERAMIC FIBER BLANKET AND RADIANT TUBES/TUBE GUIDE, PEEP HOLES.** ➢ **INSPECTION BY RELIABILTY FOR CONVECTION SECTION HEADER AND STACK REFRACTORY**. ➢ **REPAIR DAMAGED INSULATION AND REFRACTORY, ARCH SEAL REPLACMENT FOR COIL AND COIL B AS PER RELIABILITY RECOMMENDATION, (BY SCHEM).** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ COORDINATE TO REMOVE INTERNAL SCAFFOLDING. ➢ OFFER FOR FINAL INSPECTION AND BOX-UP (VESSEL CLOSURE FORM SHALL BE COMPLETED AND SIGNED OFF BEFORE START MAN WAY BOX-UP). ➢ BOX-UP ALL FURNACE MANWAYS AND APPLY TORQUE AS REQUIRED. ➢ REMOVE BLINDS AND PREPARE FOR COMMISSIONING.	➢ ARCH SEAL REPALCEMENT OF COIL A AND B.

2.3 **EXCHANGER SCOPE OF WORK:**

Inspection and Cleaning for Exchangers as per specified in detailed scope given below, but are not limited to the following:

UNIT 32

RESPONSIBILITY MATRIX		
SN #	**CONTRACTOR**	**S-CHEM**
1	**E-3201 PG ETHYLENE FEED HEATER** ➢ INSTALL BLIND FOR STEAMING/DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE

	OPERATIONS” ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING FOR BUNDLE PULLING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ EXTRACT TUBE BUNDLE AND TRANSPORT TO CLEANING YARD. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, NOZZLES AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 83 U TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ TRANSPORT BUNDLE AND COMPONENTS FROM CLEANING YARD TO LOCATION. ➢ INSERT TUBE BUNDLE AND BOX-UP. ➢ **PERFORM SHELL SIDE HYDRO TEST AT 87.0 KG/CM2 (**USE WATER CL< 100PPM THAT IS FIRE HYDRANT WATER FROM PLANT CAN BE USED WHICH HAVE CL < 100 PPM) & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. REPAIR/PLUG TUBES AS PER RECOMMENDATION AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
2	**E-3204 TRANSALKYLATOR HEATER**	

	➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 170 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 51.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
3	**E-3205 BENZENE COLUMN REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND	➢ ISOLATION AND DECONTAMINATION

	LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP TOP BONNET COVER AND BOTTOM SPOOLS AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 495 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 51.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP TOP BONNET COVER AND BOTTOM SPOOLS AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
4	**E-3207A VENT ABSORBER CHILLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM

	GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 298 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
5	**E-3207B VENT ABSORBER CHILLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON

	➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 298 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
6	**E-3208A FINISHING REACTOR INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS,

	ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 401 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 68.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
7	**E-3208B FINISHING REACTOR INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS.

	DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 401 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 68.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
8	**E-3208C FINISHING REACTOR INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL

	END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 401 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 68.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
9	**E-3208D FINISHING REACTOR INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND

	➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 401 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 68.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
10	**E-3208E FINISHING REACTOR INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY &	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE).

	PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 401 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 68.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
11	**E-3209 FINISHING REACTOR HEATER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED

	➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 271 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 52.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
12	**E-3213A ALKYLATOR VENT CONDENSER (FIN FAN)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE PLUGS FROM BOTH ENDS OF TUBE SHEET AS PER RELIABILITY RECOMMENDATION. (ADDITIONAL CARE TO BE TAKEN DURING REMOVE PLUGS AND IN CASE ANY INTERNAL THREADS DAMAGED, CONTRACTOR SHALL ARRANGE FOR RETHREAD IT).	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED

	➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 108 TUBES FOR SIZE 1-5/8" AND 20 TUBES FOR SIZE 2-1/8"** AS PER RELIABILITY RECOMMENDATION, REPORT TO RELIABILITY, ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP PLUGS WITH NEW RING GASKETS AND PREPARE FOR HYDRO TEST. ➢ PERFORM **TUBE SIDE HYDRO TEST AT 36.0 KG/CM2** ACCORDING TO RELIABILITY TEST REQUIREMENT & OFFER FOR WITNESS. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION.	NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
13	**E-3213B ALKYLATOR VENT CONDENSER (FIN FAN)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE PLUGS FROM BOTH ENDS OF TUBE SHEET AS PER RELIABILITY RECOMMENDATION. (ADDITIONAL CARE TO BE TAKEN DURING REMOVE PLUGS AND IN CASE ANY INTERNAL THREADS DAMAGED, CONTRACTOR SHALL ARRANGE FOR RETHREAD IT). ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY &	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD

	PROCESS ENGINEERING. ➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 108 TUBES FOR SIZE 1-5/8" AND 20 TUBES FOR SIZE 2-1/8"** AS PER RELIABILITY RECOMMENDATION, REPORT TO RELIABILITY, ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP PLUGS WITH NEW RING GASKETS AND PREPARE FOR HYDRO TEST. ➢ PERFORM **TUBE SIDE HYDRO TEST AT 36.0 KG/CM2** ACCORDING TO RELIABILITY TEST REQUIREMENT & OFFER FOR WITNESS. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION.	JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
14	**E-3221 EB COLUMN CONDENSER** ➢ INSTALL BLIND FOR STEAMING/DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT / INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING. CARE SHALL BE TAKEN NOT TO UNBOLT COLLAR BOLTS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ OPEN SHELL 24" MANWAYS. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, NOZZLES,	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS

	INSTRUMENT TAPS, LEVEL GAUGE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 314 U TUBES**, REPORT TO RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ BOX UP SHELL 24" MANWAY. PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 10.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
15	**E-3222 PEB COLUMN CONDENSER (FIN FAN)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE PLUGS FROM BOTH ENDS OF TUBE SHEET AS PER RELIABILITY RECOMMENDATION. (ADDITIONAL CARE TO BE TAKEN DURING REMOVE PLUGS AND IN CASE ANY INTERNAL THREADS DAMAGED, CONTRACTOR SHALL ARRANGE FOR RETHREAD IT). ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD

	➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 134 TUBES** AS PER RELIABILITY RECOMMENDATION, REPORT TO RELIABILITY, ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP PLUGS WITH NEW RING GASKETS AND PREPARE FOR HYDRO TEST. ➢ PERFORM **TUBE SIDE HYDRO TEST AT 12.0 KG/CM2** ACCORDING TO RELIABILITY TEST REQUIREMENT & OFFER FOR WITNESS. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION.	JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
16	**E-3223 FLUX OIL COOLER** ➢ INSTALL BLIND FOR STEAMING/DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT / INSPECTION BY RELIABILITY. ➢ DISASSEMBLE THE EXCHANGER EXTERNAL SHELL AND ASSOSIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE

	TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 100% OF U TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ ASSEMBLE THE EXCHANGER EXTERNAL SHELL, ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
17	**E-3225 EB SLOP COOLER (FIN FAN)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE COVER FROM BOTH ENDS OF TUBE SHEET. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK

	➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 107 TUBES FOR SIZE 25.4MM AND 24 TUBES FOR SIZE 50.8MM** AS PER RELIABILITY RECOMMENDATION, REPORT TO RELIABILITY, ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP TUBE SHEET GASKET WITH COVERS FROM BOTH ENDS OF TUBE SHEET AND PREPARE FOR HYDRO TEST. ➢ PERFORM **TUBE SIDE HYDRO TEST AT 10.0 KG/CM2** ACCORDING TO RELIABILITY TEST REQUIREMENT & OFFER FOR WITNESS. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION.	➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
18	**E-3227 PEB COLUMN REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, UNBOLT AND DROP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION /

	ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 145 TUBES,** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 45.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP TOP AND BOTTOM CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
19	**E-3228 X INTER CONDENSER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ DROP EJECTORS DURING BLINDING **(X-3201 A1 (JCP-0987) X-3201 A2, (JCP-0988), X-3201 B1 9 (JCP-0983), X-3201 B2 (JCP-0984)** ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ HYDROJET CLEAN EJECTORS **(X-3201 A1 (JCP-0987) X-3201 A2, (JCP-0988), X-3201 B1 9 (JCP-0983), X-3201 B2 (JCP-0984)** ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS **(X-3201 A1 (JCP-0987) X-3201 A2, (JCP-0988), X-3201 B1 9 (JCP-0983), X-3201 B2 (JCP-0984)** ➢ PERFORM HYDROTEST FOR THE EJECTORS **(X-3201 A1**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	(JCP-0987) X-3201 A2, (JCP-0988), X-3201 B1 9 (JCP-0983), X-3201 B2 (JCP-0984) ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ **REPLACE ANODES.** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 69 TUBES (100%)**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 24.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ PULL ALL BLINDS, INSTALL EJECTORS **(X-3201 A1 (JCP-0987) X-3201 A2, (JCP-0988), X-3201 B1 9 (JCP-0983), X-3201 B2 (JCP-0984)** AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
20	**E-3229 X AFTER CONDENSER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED

	➢ HYDROJET CLEAN TUBE BUNDLE AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ **REPLACE ANODES.** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 69 TUBES (100%)**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 24.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP BOTH END CHANNEL HEAD AND ASSOCIATED PIPING SPOOLS AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

UNIT 33

RESPONSIBILITY MATRIX		
SN #	**CONTRACTOR**	**S-CHEM**
1	**E-3301 EB VAPORIZER** ➢ INSTALL BLIND FOR STEAMING/DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT / INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING. CARE SHALL BE TAKEN NOT TO	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING

	UNBOLT COLLAR BOLTS. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ OPEN SHELL 24” MANWAYS. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, NOZZLES, INSTRUMENT TAPS, LEVEL GAUGE AND COMPONENTS. ➢ MECHANICAL CLEAN USING ROTARY BRUSHES TO CLEAN STICKY POLYMER IN THE SHELL ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 161 U TUBES**, REPORT TO RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ BOX UP SHELL 24” MANWAY. PREPARE FOR PRESSURE TESTING. ➢ PERFORM **HYDRO TEST ON SHELL SIDE FILL TEST** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
2	**E-3303 WASTE HEAT EXCH** ➢ BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **“HOLD FOR DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ OPEN SHELL MANWAYS. FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ OPEN TWO 6” HANDHOLES ON E-3303 SHELL FOR	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS.

	VISUAL INSPECTION. ➢ OPEN 24" MANWAYS ON 54" AND 66" LINES AT SHELL INLET AND OUTLET. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ ENTRY THRU MANWAY, COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET-CLEAN TUBE AND SHELL, COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION FOR TUBES AND 54" AND 66" LINES AT SHELL INLET AND OUTLET BY RELIABILITY AND PROCESS. ➢ VACUUM OUT ANY FREE WATER. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 430 TUBES**, REPORT TO RELIABILITY. ➢ DRAIN, BLOW OUT ALL FREE WATER. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP 24" MANWAYS ON 54" AND 66" LINES AT SHELL INLET AND OUTLET, SHELL MANWAYS AND TWO 6” HANDHOLES. APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION. **NOTE:** **BELOW REQUIREMENT IS COMMON FOR E-3303 AND E-3304. SINCE HYDRO JETTING WATER CAN BE COLLECTED IN ONE CATCH BASIN** • **CONTRACTOR SHALL ARRANGE CATCH BASIN / SKIP TO COLLECT THE HYDROJETTING WATER.** • **RC APPROVED CONTRACTOR VACUUM TRUCK SHALL BE AVAILABLE AND WILL BE USED DURING HYDROJETTING. THEREFORE, CONTRACTOR SHALL HAVE VACUUM TRUCKS FOR COLLECTION AND DISPOSAL OF HYDROJETTING WATER. BASED ON SAMPLE AND AS PER OPERATIONS WILL BE DECEIDED WHETHER TO DISPOSE INSIDE S-CHEM OR OUTSIDE FACILITY DURING TURNAROUND EXECUTION**.	➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

3	**E-3304 WASTE HEAT EXCH** ➢ BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ OPEN SHELL MANWAYS. FIX AIR REMOVER AND VENTILATE UNTIL READY FOR OCCUPANCY. ➢ ARRANGE INTERNAL LIGHTING FOR ENTRY. ➢ OFFER FOR INITIAL INSPECTION FROM PROCESS ENGINEERING / RELAIBILITY / OPERATIONS. ➢ ENTRY THRU MANWAY, COORDINATE TO ERECT INTERNAL SCAFFOLDING AS REQUIRED. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET-CLEAN TUBE AND SHELL, COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ VACUUM OUT ANY FREE WATER. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 510 TUBES**, REPORT TO RELIABILITY. ➢ DRAIN, BLOW OUT ALL FREE WATER. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX-UP SHELL MANWAYS. APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION. **NOTE:** **BELOW REQUIREMENT IS COMMON FOR E-3303 AND E-3304. SINCE HYDRO JETTING WATER CAN BE COLLECTED IN ONE CATCH BASIN** • **CONTRACTOR SHALL ARRANGE CATCH BASIN / SKIP TO COLLECT THE HYDROJETTING WATER.** • **RC APPROVED CONTRACTOR VACUUM TRUCK SHALL BE AVAILABLE AND WILL BE USED DURING HYDROJETTING. THEREFORE, CONTRACTOR SHALL HAVE VACUUM TRUCKS FOR COLLECTION AND DISPOSAL OF HYDROJETTING WATER. BASED ON SAMPLE AND AS PER OPERATIONS WILL BE DECEIDED WHETHER TO DISPOSE INSIDE S-CHEM OR**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	OUTSIDE FACILITY DURING TURNAROUND EXECUTION.	
4	**E-3306 MAIN CONDENSER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE PLUGS FROM BOTH ENDS OF TUBE SHEET AS PER RELIABILITY RECOMMENDATION. (ADDITIONAL CARE TO BE TAKEN DURING REMOVE PLUGS AND IN CASE ANY INTERNAL THREADS DAMAGED, CONTRACTOR SHALL ARRANGE FOR RETHREAD IT). ****** AS PER PE RECOMMENDATION- 8 BANKS = 16 BUNDLES (HIGHLIGHTED IN PLOT PLAN / DRAWING). 200 TUBES RANDOMLY PER BANK/ BAY WHICH WILL BE MARKED BY PROCESS ENGINEERING / RELIABILITY. 1 BANK / BAY HAVE 2 BUNDLES. ****** ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ **PERFORM IRIS INSPECTION ON 448 TUBES TOTAL (28 TUBES PER BUNDLE) (8 BANKS = 16 BUNDLES/PER BUNDLE-28 NOS)** AS PER RELIABILITY RECOMMENDATION. AFTER IRIS TEST SUBMIT REPORT TO RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP PLUGS WITH NEW RING GASKETS. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION. ➢ **SERVICE TEST BY OPERATIONS.** CONTRACTOR SHALL SUPPORT FOR ANY LEAK FOUND IN PLUGS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING. ➢ SERVICE TEST BY OPERATIONS.

	DURING SERVICE TEST WHICH IS BOXED UP BY CONTRACTOR.	
5	**E-3307A TRIM COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT / INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, OPEN CHANNEL COVER ➢ OPEN MANWAY, ENTRY AND INSTALL 54" BALOON TO PLUG ON TUBE INLET PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 622 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 12.5 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ REMOVE 54" BALOON TO PLUG ON TUBE INLET PIPING. ➢ BOX UP MANWAY, CHANNEL COVER AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
6	**E-3307B TRIM COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, OPEN CHANNEL COVER ➢ OPEN MANWAY, ENTRY AND INSTALL 54" BALOON TO PLUG ON TUBE INLET PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 622 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 12.5 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ REMOVE 54" BALOON TO PLUG ON TUBE INLET PIPING. ➢ BOX UP MANWAY, CHANNEL COVER AND APPLY TORQUE	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
7	**E-3308 PROCESS WATER INTERCHANGER** ➢ BLIND FOR STEAMING/DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ UNBOLT AND DROP CHANNEL COVER, SHELL COVER AND FLOATING HEAD. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 227 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR SHELL SIDE TEST AND INSTALL TEST RING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 6.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ REMOVE TEST RING. INSTALL FLOATING HEAD AND PREPARE FOR TUBE SIDE HYDRO TEST. ➢ BOX-UP CHANNEL COVER AND APPLY TORQUE AS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	REQUIRED ➢ PERFORM **TUBE SIDE HYDRO TEST AT 23.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. REPAIR/PLUG TUBES AS PER RECOMMENDATION AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL SHELL COVER AND TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
8	**E-3309 OFF GAS COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 247 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 12.5 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
9	**E-3310 OFF GAS COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 153 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 14.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	BY OTHERS AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
10	**E-3311 F/O CHILLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 121 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 20.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
11	**E-3312 F/O INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 365 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 10.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
12	**E-3313 F/O HEATER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE TOP & BOTTOM CHANNEL HEADS (BONNET) AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 76 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 8.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ENGINEERING. ➢ INSTALL AND BOX UP TOP & BOTTOM CHANNEL HEADS (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
13	**E-3314 DM CHILLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 124 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
14	**E-3315A DM INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 139 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
15	**E-3315B DM INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 139 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
16	**E-3315C DM INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 139 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	NORMAL OPERATION.	
17	**E-3315D DM INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 139 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

18	**E-3315E DM INTERCHANGER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 139 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 25.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
19	**E-3316 PAR REACTOR FEED HEATER**	

	➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE TOP & BOTTOM CHANNEL HEADS (BONNET) AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 115 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 12.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP & BOTTOM CHANNEL HEADS (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
20	**E-3317 EXCESS STEAM CONDENSER**	

	➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL COVER FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 151 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 7.21 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL COVER AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
21	**E-3320A DM COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND	➢ ISOLATION AND DECONTAMINATION

	LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 145 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
22	**E-3320B DM COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI).	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS" ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 145 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
23	**E-3351A SPLITTER REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON

	➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK SHELL SIDE SPRING SUPPORT. ➢ OPEN TOP MANWAY AND DROP BOTTOM SPOOL AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 510 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 8.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP MANWAY, BOTTOM SPOOL AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK SHELL SIDE SPRING SUPPORT, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
24	**E-3351B SPLITTER REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS)

	OPERATIONS" ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK SHELL SIDE SPRING SUPPORT. ➢ OPEN TOP MANWAY AND DROP BOTTOM SPOOL AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 510 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 8.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP MANWAY, BOTTOM SPOOL AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK SHELL SIDE SPRING SUPPORT, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
25	**E-3352 SPLITTER CONDENSER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI).	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS" ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ REMOVE FIN FAN HEADER BOX CAGE GUARDS. ➢ INSTALL WATER SHIELD WITH DRAIN TO GROUND ON BACK SIDE OF FAN BANK. ➢ REMOVE PLUGS FROM BOTH ENDS OF TUBE SHEET AS PER RELIABILITY RECOMMENDATION. (ADDITIONAL CARE TO BE TAKEN DURING REMOVE PLUGS AND IN CASE ANY INTERNAL THREADS DAMAGED, CONTRACTOR SHALL ARRANGE FOR RETHREAD IT). ****** AS PER PE RECOMMENDATION- 4 BANKS = 8 BUNDLES (HIGHLIGHTED IN PLOT PLAN / DRAWING). 200 TUBES RANDOMLY PER BANK/ BAY WHICH WILL BE MARKED BY PROCESS ENGINEERING / RELIABILITY. 1 BANK / BAY HAVE 2 BUNDLES. ****** ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ HYDRO JET CLEAN TUBES AND COMPONENTS. AIR BLOW EACH TUBES & DRY, INSPECT FOR CLEAN. ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT / UTT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 224 TUBES TOTAL (28 TUBES PER BUNDLE) (4 BANKS = 8 BUNDLES/PER BUNDLE-28 NOS)** AS PER RELIABILITY RECOMMENDATION. AFTER IRIS TEST SUBMIT REPORT TO RELIABILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ OFFER FOR FINAL INSPECTION ➢ INSTALL AND BOX-UP PLUGS WITH NEW RING GASKETS. ➢ INSTALL AND BOX UP FIN FAN HEADER BOX CAGE GUARDS. ➢ PULL BLINDS AND PREPARE FOR NORMAL OPERATION. ➢ **SERVICE TEST BY OPERATIONS.** CONTRACTOR SHALL SUPPORT FOR ANY LEAK FOUND IN PLUGS DURING SERVICE TEST WHICH IS BOXED UP BY CONTRACTOR.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING. ➢ SERVICE TEST BY OPERATIONS.
26	**E-3355 EB RECOVERY COLUMN REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI).	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS" ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK SHELL SIDE SPRING SUPPORT. ➢ OPEN TOP CHANNEL COVER AND DROP BOTTOM SPOOL AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 217 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 112.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP CHANNEL COVER, BOTTOM SPOOL AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK SHELL SIDE SPRING SUPPORT, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
27	**E-3358A SM COL. REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM

	GI). **“HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS”** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK SHELL SIDE SPRING SUPPORT. ➢ OPEN TOP CHANNEL COVER AND DROP BOTTOM SPOOL AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 510 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 8.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP CHANNEL COVER, BOTTOM SPOOL AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK SHELL SIDE SPRING SUPPORT, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
28	**E-3358B SM COL. REBOILER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND	➢ ISOLATION AND DECONTAMINATION

	LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK SHELL SIDE SPRING SUPPORT. ➢ OPEN TOP CHANNEL COVER AND DROP BOTTOM SPOOL AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **IRIS INSPECTION ON 510 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 8.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP CHANNEL COVER, BOTTOM SPOOL AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK SHELL SIDE SPRING SUPPORT, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
29	**E-3359 SM COL. CONDENSER**	

	➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, OPEN TOP AND DROP BOTTOM MANWAY AND ASSOCIATED PIPING. ➢ REMOVE 12" SPOOL BETWEEN E-3359 AND D-3355 AND CONNECT HOSE TO DRAIN TO GRADE. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 440 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP TOP AND BOTTOM MANWAY AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. UTT ON HEAD AND AS PER TML. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
30	**E-3362 SM PROD. CHILLER**	

	➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **SECT INSPECTION ON 160 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 13.96 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
31	**E-3363A DM SLOP COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND	➢ ISOLATION AND DECONTAMINATION

	LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 130 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
32	**E-3363B DM SLOP COOLER** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI).	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD

	"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS" ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ LOCK EXPANSION BELLOWS, REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 130 TUBES**, REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 11.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ UNLOCK EXPANSION BELLOWS, PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.
33	**E-3367 INTER CONDENSER (V-3352)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON

	➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ DROP EJECTORS DURING BLINDING **(X-3353 B1 (JCP-1129), X-3353 B2 (JCP-1130), X-3353 A1 (JCP-1131), X-3353 A2 (JCP-1132)** ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ HYDROJET CLEAN EJECTORS **(X-3353 B1 (JCP-1129), X-3353 B2 (JCP-1130), X-3353 A1 (JCP-1131), X-3353 A2 (JCP-1132)** ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS **(X-3353 B1 (JCP-1129), X-3353 B2 (JCP-1130), X-3353 A1 (JCP-1131), X-3353 A2 (JCP-1132)** ➢ PERFORM HYDROTEST FOR THE EJECTORS **(X-3353 B1 (JCP-1129), X-3353 B2 (JCP-1130), X-3353 A1 (JCP-1131), X-3353 A2 (JCP-1132)** ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ **REPLACE ANODE.** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 38 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 9.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL ALL BLINDS, INSTALL EJECTORS **(X-3353 B1 (JCP-1129), X-3353 B2 (JCP-1130), X-3353 A1 (JCP-1131), X-3353 A2 (JCP-1132)** AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
34	**E-3368 AFTER CONDENSER (V-3352)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ **REPLACE ANODE.** ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 38 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 9.0 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
35	**E-3383 STEAM TURBINE GLAND CONDENSER (KT-3301A)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET), CHANNEL COVER AND CHANNEL HEAD AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 19 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 6.9 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET), CHANNEL COVER AND CHANNEL HEAD AND	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ASSOCIATED PIPIN AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
36	**E-3386 STEAM TURBINE GLAND CONDENSER (KT-3301B)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET), CHANNEL COVER AND CHANNEL HEAD AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 19 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 6.9 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET), CHANNEL HEAD AND CHANNEL COVER AND	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	ASSOCIATED PIPIN AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND PREPARE FOR NORMAL OPERATION.	
37	**E-3391 GLAND CONDENSER (KT-3351)** ➢ INSTALL BLIND FOR DECONTAMINATION, (AS PER BLIND LIST) (SHOULD BE WITH BREATHING APPARATUS AS PER GI). **"HOLD FOR STEAMING / DECONTAMINATION BY OPERATIONS"** ➢ BLIND / DROP SPOOLS AS PER BLIND LIST PROVIDED AND PREPARE THE EQUIPMENT READY FOR MAINTENANCE ACTIVITIES. ➢ PERFORM BUFFING FOR LIFTING LUGS WELD JOINT TO DO DPT INSPECTION BY RELIABILITY. ➢ REMOVE CHANNEL HEAD (BONNET) FROM BOTH SIDE AND ASSOCIATED PIPING. ➢ COORDINATE TO MODIFY SCAFFOLDING AS REQUIRED. ➢ PERFORM INITIAL INSPECTION FROM RELIABILITY & PROCESS ENGINEERING. ➢ PREPARE FOR HYDROJETTING. ➢ HYDROJET CLEAN TUBE BUNDLE, SHELL, AND COMPONENTS. ➢ PERFORM AIR BLOWING. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ BUFFING SUPPORT AS REQUIRED USING PNEUMATIC TOOL FOR DPT AND UTT AS PER RELIABILITY RECOMMENDATION. ➢ CO-ORDINATE WITH S-CHEM RELIABILITY AND SUPPORT FOR DPT INSPECTION BY S-CHEM RELIABILITY. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ POST CLEANING INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ PERFORM **ECT INSPECTION ON 108 TUBES (100%),** REPORT TO RELIABILITY. ➢ PREPARE FOR PRESSURE TESTING. ➢ PERFORM **SHELL SIDE HYDRO TEST AT 7.95 KG/CM2** & OFFER FOR WITNESS BY RELIABILITY. ➢ IF LEAK, RELEASE PRESSURE / DRAIN WATER. **REPAIR/PLUG TUBES AS PER RECOMMENDATION BY OTHERS** AND RE-DO HYDRO TEST AS RECOMMENDED AFTER REPAIR / PLUG AND OFFER FOR WITNESS BY RELIABILITY. ➢ RELEASE PRESSURE / DRAIN WATER AND PERFORM AIR BLOWING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ INSTALL AND BOX UP CHANNEL HEAD (BONNET) AND ASSOCIATED PIPING AND APPLY TORQUE AS REQUIRED. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED AND	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT FOR RANDOM/SUSPECTED NOZZLES, T-JOINTS AND WELD JOINTS INCLUDING SUPPORTS WELDS. ➢ SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK ➢ DISCONNECT AND RECONNECT INSTRUMENT CONNECTIONS. ➢ WELDING ACTIVITIES. ➢ TUBE ROLLING / TUBE EXTRACTION / TUBE PUNCTURING / TUBE PLUGGING / POP A PLUGGING.

	PREPARE FOR NORMAL OPERATION.	

2.4 **PRD SCOPE OF WORK:**

PRD removal and Reinstallation as per specified in detailed scope given below but are not limited to the following:

RESPONSIBIL	
CONTRA	**S-CHEM**
➢ REMOVAL OF PRDS FROM LOCATION AND SHIFT PRD TO DESIGNATED AREA INSIDE COMAPNY FACILITY. ➢ BLIND BOTH PIPING SIDE WITH END BLINDS. ➢ COLLECT THE PRD'S FROM LAY DOWN YARD/TURNAROUND WAREHOUSE AND SHIFT TO LOCATION. ➢ REMOVE END BLINDS & RE-INSTALL PRD. ➢ PRDS FOR REPLACE SHALL BE COLLECTED FROM TURNAROUND WAREHOUSE AND THE REMOVED PRD SHOULD HAND OVER TO T/A WAREHOUSE. ➢ PRD SHALL BE TRANSPORTED IN VERTICAL	➢ DECONTAMINATION AND ISOLATION OF SYSTEM/EQUIPMENT. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, EXTERNAL LIGHTING. ➢ SCAFFOLDING (ERECTION & DISMATLLING) AND INSULATION (REMOVAL & REINSTALLATION).

Note: CONTRACTOR should take care of below points and make arrangements accordingly.

Note:

- CONTRACTOR should evaluate the valves independently and arrange crane and other resources according to requirement.
- CONTRACTOR should collect end blinds from TA warehouse and returned upon completion of the work.

UNIT 32

Sl. No	Serial Number	Tag No	Inlet Size	Outlet Size	Remarks
1	JCP-0141	PRD-32004	1" X 300 #	2" X 150 #	
2	JCP-0979	PRD-32006	3" X 900 RTJ	4" X 150 #	
3	JCP-0062	PRD-32009	3" X 300 #	4" X 150 #	
4	JCP-0980	PRD-32012	1" X 300 #	2" X 150 #	
5	JCP-2076	PRD-32014	1" X 600 RTJ	2" X 150 #	
6	JCP-2086	PRD-32015	2" X 1500 RTJ	3" X 300 #	
7	JCP-2182	PRD-32016	3" X 300 #	4" X 150 #	

8	JCP-0871	PRD-32017	1" X 600 #	2" X 150 #	
9	JCP-0158	PRD-32020	1" X 600 #	2" X 150 #	
10	JCP-0157	PRD-32022	8" X 300 #	10" X 150 #	
11	JCP-0850	PRD-32029A	6" X 300 #	8" X 150 #	
12	JCP-0844	PRD-32032	1" X 300 #	2" X 150 #	
13	JCP-0846	PRD-32033	1" X 600 #	2" X 150 #	
14	JCP-0994	PRD-32035	1" X 300 #	2" X 150 #	
15	JCP-0995	PRD-32037	1" X 300 #	2" X 150 #	
16	JCP-0845	PRD-32038	3" X 300 #	4" X 150 #	
17	JCP-0977	PRD-32042	1.5" X 300 #	3" X 150 #	
18	JCP-0063	PRD-32278	1.5" X 300 #	3" X 150 #	
19	JCP-0140	PRD-32312	0.75" X 300 #	1" X 150 #	
20	JCP-0978	PRD-32356	1.5" X 300 #	2" X 150 #	
21	JCP-0982	PRD-32358	1" X 300 #	2" X 150 #	
22	JCP-0981	PRD-32405	2" X 600 #	3" X 150 #	
23	JCP-2183	PRD-32896	1" X 300 #	2" X 150 #	
24	JCP-0430	PRD-32021A	8" X 300 #	10" X 150 #	
25	AWR# 290	SP-32V10	16” X 600# RTJ	8” X 600# RTJ	
26	AWR# 291	SP-32V11	16” X 600# RTJ	8” X 600# RTJ	

UNIT 33

Sl. No	Serial Number	Tag No	Inlet Size	Outlet Size	Remarks
1	JCP-0291	PRD-33002	4" X 300 #	6" X 150 #	
2	JCP-0279	PRD-33005	1.5" X 300 #	3" X 150 #	
3	JCP-0250	PRD-33006	1.5" X 300 #	3" X 150 #	
4	JCP-0240	PRD-33008	1.5" X 300 #	3" X 150 #	
5	JCP-0241	PRD-33009	1.5" X 300 #	3" X 150 #	

6	JCP-0242	PRD-33010	8" X 300 #	10" X 150 #	
7	JCP-0280	PRD-33012	1" X 300 #	2" X 150 #	
8	JCP-0243	PRD-33013	8" X 300 #	10" X 150 #	
9	JCP-0244	PRD-33014	6" X 300 #	10" X 150 #	
10	JCP-0245	PRD-33015	1.5" X 150 #	2.5" X 150 #	
11	JCP-0246	PRD-33016	1.5" X 150 #	2.5" X 150 #	
12	JCP-0247	PRD-33018	1.5" X 150 #	2.5" X 150 #	
13	JCP-0281	PRD-33020	1" X 150 #	2" X 150 #	
14	JCP-0248	PRD-33025	1.5" X 300 #	3" X 150 #	
15	JCP-0942	PRD-33026	1" X 300 #	2" X 150 #	
16	JCP-0943	PRD-33027	1" X 300 #	2" X 150 #	
17	JCP-0880	PRD-33028	4" X 300 #	6" X 150 #	
18	JCP-0881	PRD-33029	4" X 300 #	6" X 150 #	
19	JCP-0882	PRD-33031	3" X 300 #	4" X 150 #	
20	JCP-0883	PRD-33032	4" X 300 #	6" X 150 #	
21	JCP-0072	PRD-33051	1" X 600 #	2" X 150 #	
22	JCP-0944	PRD-33053	1" X 300 #	2" X 150 #	
23	JCP-0945	PRD-33055	1" X 300 #	2" X 150 #	
24	JCP-0967	PRD-33057	2" X 300 #	3" X 150 #	
25	JCP-0223	PRD-33151	1" X 150 #	2" X 150 #	
26	JCP-1108	PRD-33304	0.75" X 150 #	1" X 150 #	
27	JCP-1109	PRD-33305	0.75" X 300 #	1" X 150 #	
28	JCP-0142	PRD-33314	0.75" X 300 #	1" X 150 #	
29	JCP-0143	PRD-33315	0.75" X 300 #	1" X 150 #	
30	JCP-0144	PRD-33316	0.75" X 300 #	1" X 150 #	
31	JCP-2028	PRD-33337	4" X 300 #	6" X 150 #	
32	JCP-1974	PRD-33340	6" X 300 #	8" X 150 #	
33	JCP-0145	PRD-33343	0.75" X 300 #	1" X 150 #	

34	JCP-0968	PRD-33361	4" X 300 #	6" X 150 #	
35	JCP-2012	PRD-33377A	8" X 300 #	10" X 150 #	
36	JCP-2022	PRD-33377B	8" X 300 #	10" X 150 #	
37	JCP-2013	PRD-33377C	8" X 300 #	10" X 150 #	
38	JCP-2011	PRD-33377D	8" X 300 #	10" X 150 #	
39	JCP-2025	PRD-33387A	8" X 300 #	10" X 150 #	
40	JCP-2026	PRD-33387B	8" X 300 #	10" X 150 #	
41	JCP-2027	PRD-33387C	8" X 300 #	10" X 150 #	
42	JCP-2029	PRD-33390	8" X 300 #	10" X 150 #	
43	JCP-2030	PRD-33392	4" X 300 #	6" X 150 #	
44	JCP-2031	PRD-33398	3" X 300 #	4" X 150 #	
45	JCP-0885	PRD-33444	1" X 300 #	2" X 150 #	
46	JCP-1010	PRD-33457	0.75" X 150 #	1" X 150 #	
47	JCP-0615	PRD-33501	4" X 300 #	6" X 300	
48	JCP-0760	PRD-33515	1" X 300 #	2" X 150 #	
49	JCP-0761	PRD-33516	1" X 300 #	2" X 150 #	
50	JCP-0435	PRD-33518	1" X 600 #	2" X 150 #	
51	JCP-0616	PRD-33519	1" X 600 #	2" X 150 #	
52	JCP-0436	PRD-33520	1" X 300 #	2" X 150 #	
53	JCP-1124	PRD-33525	1" X 300 #	2" X 150 #	
54	JCP-1125	PRD-33528	1" X 300 #	2" X 150 #	
55	JCP-0249	PRD-33530	3" X 300 #	4" X 150 #	
56	JCP-0969	PRD-33531	1.5" X 150 #	3" X 150 #	
57	JCP-2033	PRD-33532	6" X 300 #	8" X 150 #	
58	JCP-0886	PRD-33533	6" X 300 #	10" X 150 #	
59	JCP-0887	PRD-33554	1" X 300 #	2" X 150 #	
60	JCP-758	PRD-33555	3" X 300 #	4" X 150 #	
61	JCP-0884	PRD-33559	1.5" X 300 #	3" X 150 #	
62	JCP-1126	PRD-33654	0.5" X 300 #	1" X 150 #	
63	JCP-0762	PRD-33667	1.5" X 600	3" X 150 #	

			#		
64	JCP-0962	PRD-33676	1" X 300 #	2" X 150 #	
65	JCP-2018	PRD-33701	1" X 300 #	2" X 150 #	
66	JCP-0862	PRD-33737A	6" X 300 #	10" X 150 #	
67	JCP-0863	PRD-33737B	6" X 300 #	10" X 150 #	
68	JCP-1127	PRD-33846	1" X 300 #	2" X 150 #	
69	JCP-1128	PRD-33862	3" X 300 #	4" X 150 #	
70	JCP-0614	PRD-33901	1" X 300 #	2" X 150 #	
71	JCP-0892	PRD-33912	1" X 300 #	2" X 150 #	
72	JCP-0224	PRD-33960	1" X 300 #	2" X 150 #	
73	JCP-2034	PRD-33993	6" X 300 #	8" X 150 #	
74	AWR# 178	PRD-33556	6" X 300 #		
75	AWR# 179	PRD-33557	24" X 150 #		
76	AWR# 180	PRD-33046	0.75" X 300 #	1" X 150 #	
77	AWR# 181	PRD-33030	1" X 300 #	2" X 150 #	
78	AWR# 212	PRD-33301	1" X 150 #	2" X 150 #	
79	AWR# 213	PRD-33302	1" X 150 #	2" X 150 #	
80	AWR#221	PRD-33477	10" X 150 #		
81	AWR# 220	PRD-33478	24" X 150 #		
82	AWR# 249	PRD-33630	0.5" X SMNPT	1" X SFNPT	
83	AWR# 250	PRD-33241	0.75" X 150 #	1" X 150 #	
84	AWR# 251	PRD-33017	6" X 300 #	8" X 150 #	
85	AWR# 252	PRD-33019	6" X 300 #	8" X 150 #	
86	AWR# 253	PRD-33632	1.5" X 150 #	2" X 150 #	
87	AWR# 254	PRD-33633	1.5" X 150 #	2" X 150 #	
88	AWR# 256	PRD-33646	1" X 300 #	1" X 150 #	
89	AWR# 257	PRD-33670	0.5" X SMNPT	1" X SFNPT	
90	AWR# 258	PRD-33671	0.5" X SMNPT	1" X SFNPT	
91	AWR# 259	PRD-33022	8" X 150 #	6" X 300	

92	AWR# 261	PRD-33685	1" X 300 #	2" X 150 #	
93	AWR# 262	PRD-33021	6" X 300 #	8" X 150 #	
94	AWR# 263	PRD-33672	1.5" X 150 #	2" X 150 #	
95	AWR# 260	PRD-33281	0.75" X 150 #	1" X 150 #	
96	AWR# 264	PRD-33673	1.5" X 150 #	2" X 150 #	

2.5 **CONTROL VALVES SCOPE OF WORK:**

Control Valves (CV's) Removal and Reinstallation as per specified in detailed scope given below, but are not limited to the following:

RESPONSIBILIT	
CONTRAC	**S-CHEM**
➢ REMOVAL OF CV'S FROM LOCATION AND SHIFT CV TO DESIGNATED AREA INSIDE COMPANY FACILITY ➢ BLIND BOTH PIPING SIDE WITH END BLINDS. ➢ COLLECT THE CV'S FROM LAY DOWN YARD/TURNAROUND WAREHOUSE AND SHIFT TO LOCATION. ➢ REMOVE END BLINDS & RE-INSTALL CV ➢ TORQUE AS NEEDED. ➢ CV'S FOR REPLACE SHALL BE COLLECTED FROM TURNAROUND WAREHOUSE AND THE REMOVED CV'S SHOULD HAND OVER TO T/A WAREHOUSE. ➢ CV'S HAVING PRESENCE OF NORMS SHALL BE TRANSPORTED TO CLEANING PAD FOR HYDRO CLEAN. AFTER HYDRO CLEAN SEND TO TA YARD. (CV'S HAVING POTENTIAL FOR NORMS ARE SPECIFIED IN REMARKS COLUMN OF LISTED CV'S GIVEN BELOW.	➢ DECONTAMINATION AND ISOLATION OF SYSTEM/EQUIPMENT. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, EXTERNAL LIGHTING. ➢ SCAFFOLDING (ERECTION & DISMATLLING) AND INSULATION (REMOVAL & REINSTALLATION).

Note: Contractor should take care of below points and make arrangements accordingly.

Note:

- Contractor should evaluate the valves independently and arrange crane and other resources according to requirement.
- Contractor should collect end blinds from TA warehouse and returned upon completion of the work.
- CV's having presence of NORMS shall be transported to Cleaning pad for Hydro clean. After Hydro clean send to TA Yard. Take Proper Precautions for NORM Presence equipment.

UNIT 32

SL	Line#	System	Tag#	Siz	Rati	Qt	Remarks

#				e	ng	y	
1	JCP-0074	ALKYLATOR SYSTEM	XV-32005Y	6"	150	1	
2	JCP-0075	ALKYLATOR SYSTEM	XV-32007X	3"	150	1	
3	JCP-0076	ALKYLATOR SYSTEM	XV-32007Y	1.5"	150	1	
4	JCP-0077	ALKYLATOR SYSTEM	XV-32005Z	0.75"	150	1	
5	JCP-0078	ALKYLATOR SYSTEM	XV-32007Z	0.75"	150	1	
6	JCP-0079	ALKYLATOR SYSTEM	FV-32008	6"	300	1	
7	JCP-0080	ALKYLATOR SYSTEM	FV-32009	6"	300	1	
8	JCP-0084	ALKYLATOR SYSTEM	FV-32002	18"	300	1	
9	JCP-0130	ALKYLATOR SYSTEM	FV-32010	3"	300	1	
10	JCP-0162	Benzene Column System	XV-32019X	8"	600	1	
11	JCP-0163	Benzene Column System	XV-32019Y	8"	600	1	
12	JCP-0164	Benzene Column System	XV-32026X	8"	600	1	
13	JCP-0165	Benzene Column System	XV-32026Y	8"	600	1	
14	JCP-0166	Benzene Column System	XV-32043X	10"	300	1	
15	JCP-0167	Benzene Column System	XV-32043Y	10"	300	1	
16	JCP-0329	Dehydro System	FV-32051	3"	300	1	
17	JCP-0853	Ethyl Benzene System	FV-32052	3"	300	1	
18	JCP-0898	ALKYLATOR SYSTEM	PV-32008B	12"	300	1	
19	JCP-0970	Polyethyl Benzene System	XV-32051X	4"	300	1	
20	JCP-0971	Polyethyl Benzene System	XV-32070X	6"	600	1	

21	JCP-0972	Transalkylator System	XV-32051Y	4"	300	1	
22	JCP-1004	Finishing Reactor System	XV-32015X	6"	600	1	
23	JCP-2293	ALKYLATOR SYSTEM	FV-32005	6"	300	1	
24	JCP-2294	ALKYLATOR SYSTEM	FV-32006	6"	300	1	
25	JCP-2295	ALKYLATOR SYSTEM	FV-32007	6"	300	1	

UNIT 33

SL #	Line#	System	Tag#	Size	Rating	Qty	Remarks
1	JCP-0312	Dehydro System	XV-33020X	20"	150	1	
2	JCP-0313	Dehydro System	XV-33020Y	20"	150	1	
3	JCP-0314	Dehydro System	XV-33006X	10"	150	1	
4	JCP-0315	Dehydro System	XV-33006Y	10"	150	1	
5	JCP-0316	Dehydro System	XV-33003X	10"	150	1	
6	JCP-0317	Dehydro System	XV-33003Y	10"	150	1	
7	JCP-0323	Dehydro System	XV-33068X	24"	150	1	
8	JCP-0324	Dehydro System	XV-33068Y	24"	150	1	
9	JCP-0325	Dehydro System	XV-33069X	24"	150	1	
10	JCP-0326	Dehydro System	XV-33069Y	24"	150	1	
11	JCP-0327	Dehydro System	XV-33070X	16"	600	1	
12	JCP-0328	Dehydro System	XV-33070Y	16"	600	1	
13	JCP-0371	Dehydro System	FV-33010	24"	300	1	

14	JCP-0382	Dehydro System	FV-33011	16"	300	1	
15	JCP-0893	Fuel Gas System	XV-33006Z	0.75"	150	1	
16	JCP-0894	Fuel Gas System	XV-33009Y	2"	150	1	
17	JCP-0895	Fuel Gas System	XV-33009Z	0.75"	150	1	
18	JCP-0896	Fuel Gas System	XV-33012Y	2"	150	1	
19	JCP-0897	Fuel Gas System	XV-33012Z	0.75"	150	1	
20	JCP-0924	OFF GAS COMPRESSOR	PV-33044	20"	300	1	
21	JCP-0953	PAR SYSTEM	XV-33981	8"	300	1	
22	JCP-0964	PAR SYSTEM	XV-33064X	6"	150	1	
23	JCP-0965	PAR SYSTEM	XV-33064Y	6"	150	1	
24	JCP-1012	Refrigeration System	PV-33204A	8"	300	1	
25	JCP-1013	Refrigeration System	PV-33204B	1.5"	300	1	
26	JCP-1014	Refrigeration System	FV-33218	12"	300	1	
27	JCP-1015	Refrigeration System	FV-33220	8"	300	1	
28	JCP-1038	Refrigeration System	PCV-33307	2"	300	1	
29	JCP-1039	Refrigeration System	TV-33369	3"	300	1	
30	JCP-1106	Refrigeration System	PCV-33216	0.75"	150	1	
31	JCP-1107	Refrigeration System	PCV-33303	2"	300	1	
32	JCP-1703	SM COLUMN & WIPED FILM EVAPORATOR SYSTEM	PV-33521	1.5"	300	1	
33	JCP-1985	Steam & Condensate System	FV-33634	6"	300	1	

34	JCP-2032	TAR DRUM SYSTEM	PV-33522	1"	300	1	
35	JCP-2057	Steam & Condensate System	FV-33224	8"	300	1	
36	JCP-2298	Dehydro system	XV-33003Z	0.75"	150	1	
37	JCP-2299	Dehydro system	XV-33009X	2"	150	1	
38	JCP-2300	Dehydro system	XV-33012X	2"	150	1	
39	JCP-2301	Refrigeration System	XV-33228	12"	150	1	
40	JCP-2302	Refrigeration System	XV-33229	28"	150	1	
41	JCP-2303	Refrigeration System	XV-33230	18"	300	1	
42	JCP-2304	Refrigeration System	PDV-33383	0.75"	300	1	
43	AWR-166	Dehydro System	FV-33001	20"	300	1	
44	AWR-268	OFF GAS COMPRESSOR	PCV-33648	1"	300	1	
45	AWR-268	OFF GAS COMPRESSOR	PDCV-33275	1"	150	1	
46	AWR-268	OFF GAS COMPRESSOR	PDCV-33274	1"	150	1	
47	AWR-268	OFF GAS COMPRESSOR	PDCV-33255	1"	150	1	
48	AWR-268	OFF GAS COMPRESSOR	FV-33048	1.5"	300	1	
49	AWR-268	OFF GAS COMPRESSOR	PCV-33635	1"	150	1	
50	AWR-268	OFF GAS COMPRESSOR	PCV-33634	1.5"	150	1	
51	AWR-268	OFF GAS COMPRESSOR	TV-33653	2"	150	1	
52	AWR-269	OFF GAS COMPRESSOR	PCV-33686	1"	300	1	
53	AWR-269	OFF GAS COMPRESSOR	PDCV-33289	1"	150	1	

54	AWR-269	OFF GAS COMPRESSOR	PDCV-33288	1"	150	1	
55	AWR-269	OFF GAS COMPRESSOR	PDCV-33295	1"	150	1	
56	AWR-269	OFF GAS COMPRESSOR	FV-33050	1.5"	300	1	
57	AWR-269	OFF GAS COMPRESSOR	PCV-33675	1"	150	1	
58	AWR-269	OFF GAS COMPRESSOR	PCV-33674	1.5"	150	1	
59	AWR-269	OFF GAS COMPRESSOR	TV-33688	2"	150	1	
60	AWR-267	Steam & Condensate System	PV-33376A	8"	300	1	

2.6 **INSTRUMENT TRANSMITTER WORKS SCOPE OF WORK:**

Perform Instrument Transmitter Works as per specified in detailed scope given below, but are not limited to the following:

RESPONSIBILIT	
	S-CHEM
➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ DISCONNECT INSTRUMENT CONNECTION BY COMPANY. ➢ REMOVE EXISTING LEVEL TRANSMITTER. ➢ SHIFT LEVEL TRANSMITTER FROM SITE TO COMPANY INSTRUMENT MAINTENANCE SHOP ➢ CALIBRATION BY COMPANY ➢ SHIFT LEVEL TRANSMITTER FROM COMPANY INSTRUMENT MAINTENANCE SHOP TO SITE ➢ RE-INSTALL LEVEL TRANSMITTER. ➢ RECONNECT INSTRUMENT CONNECTION AND FUNCTION CHECK BY COMPANY.	➢ DECONTAMINATION AND ISOLATION OF SYSTEM/EQUIPMENT. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, EXTERNAL LIGHTING. ➢ SCAFFOLDING (ERECTION & DISMATLLING) AND INSULATION (REMOVAL & REINSTALLATION). ➢ INSTRUMENT CONNECTION, DECONNECTION AND FUNCTION TEST.

UNIT 33

Sl. No	Line number	Tag No	Size	Rating	Qty
1	JCP-0383	LT-33011	3"	150	1
2	JCP-0384	LT-33028X	3"	150	1
3	JCP-0385	LT-33028Y	3"	150	1
4	JCP-0386	LT-	3"	150	1

		33028Z			
5	JCP-1704	LT-33516	3"	300	1
6	JCP-1705	LT-33882X	3"	300	1
7	JCP-1706	LT-33882Y	3"	300	1
8	JCP-1708	LT-33882Z	3"	300	1
9	AWR-172	FT-33500	2"	600	1

2.7 **INSTRUMENT ACTUATOR WORKS SCOPE OF WORK:**

Perform Instrument Actuator Works as per specified in detailed scope given below, but are not limited to the following:

UNIT 32

RESPONSIBI	
CONTRACTOR	**S-CHEM**
JCP-0081: HV-32007 ACTUATOR SWAPPING ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ DISCONNECT INSTRUMENT CONNECTION BY COMPANY. ➢ SUPPORT INSTRUMENT TEAM DURING REMOVAL OF ACTUATOR. ➢ DROP ACTUATOR AND INSTALL NEW ACTUATOR SUPPORTING INSTRUMENT TEAM. ➢ RECONNECT INSTRUMENT CONNECTION AND FUNCTION CHECK BY COMPANY. ➢ SHIFT REMOVED ACTUATOR FROM SITE TO	➢ DECONTAMINATION AND ISOLATION OF SYSTEM/EQUIPMENT. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, EXTERNAL LIGHTING. ➢ SCAFFOLDING (ERECTION & DISMATLLING) AND INSULATION (REMOVAL & REINSTALLATION). ➢ INSTRUMENT CONNECTION, DECONNECTION AND FUNCTION TEST.

2.8 **PIPING COLD WORKS SCOPE OF WORK:**

Perform Piping Cold Works as per specified in detailed scope given below, but are not limited to the following:

UNIT 32

Sl. No	Line number	Tag No	Scope of Work	Size & Qty
1	JCP-0136	E-3214	**E-3214 WATER BOOT LG -32033 AND MAIN**	2” x 300# - 2 Nos.

			CHAMBER ISOLATION VALVES. ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE EXISTING VALVES AND LG -32033. ➢ HYDROJECT CLEAN LG AND REPALCE LG GLASS. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES, LG-32033 AND TORQUE AS APPLICABLE.	
2	JCP-0430	PRD-32021 A	**REPLACE UPSTREAM B/V OF PRD-32021 A** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE EXISTING VALVE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVE AND TORQUE AS APPLICABLE.	12” x 150# - 1 Nos.
3	AWR-182	E-3221	**REPLACE INTERMEDIATE BLOWDOWN VALVE FOR E-3221** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	2” x 150# - 1 Nos.
4	AWR-183	P-3213A	**REPLACE SUCTION AND DISCHARGE VALVES** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	10” x 600# - 2 Nos. 12” x 300# - 2 Nos.
5	AWR-184	P-3213A	**REPLACE SUCTION AND DISCHARGE VALVES** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR	10” x 600# - 2 Nos. 12” x 300# -

			INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	2 Nos.

UNIT 33

Sl. No	Line number	Tag No	Scope of Work	Size & Qty
1	JCP-1910	C-3353	**TO REMOVE THE T-CLAMP AND TO REPLACE INLET AND OUTLET VALVES OF SP-33P12B C-3353 REFLUX LINE.** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	4” x 150# - 2 Nos.
2	JCP-1915	P-3356 A	**REPLACE SUCTION AND DISCHARGE VALVES** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	8” x 150# - 1 Nos. 10” x 150# - 1 Nos.
3	JCP-1916	P-3356 B	**REPLACE SUCTION AND DISCHARGE VALVES** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	8” x 150# - 1 Nos. 10” x 150# - 1 Nos.
4	JCP-1919	C-3353	**TO REMOVE THE T-CLAMP AND TO REPLACE INLET AND OUTLET VALVES OF SP-33P12A C-**	4” x 150# - 2 Nos.

			3353 REFLUX LINE. ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE CLAMP AND DROP EXISTING VALVES AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVES AND TORQUE AS APPLICABLE	
5	AWR-266	P-3357 A	**REPLACE P-3357A SUCTION VALVE** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ REMOVE EXISTING VALVE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY. ➢ INSTALL NEW VALVE AND TORQUE AS APPLICABLE	10” x 150# - 1 Nos.

2.9 **PIPE CLEANING AND INSPECTION SCOPE OF WORK:**

Perform Inspection and cleaning as per specified in detailed scope given below, but are not limited to the following:

UNIT 32

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**IPL-32XC051 & 52 in line P-32033-6: AWR-293** ➢ CONTRACTOR SHALL VERIFY THE LTT ➢ DROP CHECK VALVES & INSTALL BLINDS ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDRO CLEAN / HAND CLEAN CHECK VALVES ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIABILITY ➢ REMOVE BLINDS & INSTALL CHECK VALVES ➢ TORQUE AS APPLICABLE	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION.

		➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.
2	**IPL-32XC053 of P-3374 discharge in line P-33176-6": AWR-294** ➢ CONTRACTOR SHALL VERIFY THE LTT ➢ DROP CHECK VALVES & INSTALL BLINDS ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDRO CLEAN / HAND CLEAN CHECK VALVES ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIABILITY. ➢ REMOVE BLINDS & INSTALL CHECK VALVES ➢ TORQUE AS APPLICABLE	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.

UNIT 33

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**CLEANING AND INSPECTION OF EJECTORS- JCP-0783: X-3352 A1** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES.

2	**CLEANING AND INSPECTION OF EJECTORS- JCP-0784: X-3352 A2** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.
3	**CLEANING AND INSPECTION OF EJECTORS- JCP-0785: X-3352 B1** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES.
4	**CLEANING AND INSPECTION OF EJECTORS- JCP-0786: X-3352 B2** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS.

	RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.
5	**CLEANING AND INSPECTION OF EJECTORS- AWR-365: X-3391** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.
6	**CLEANING AND INSPECTION OF EJECTORS- AWR-366: X-3392** ➢ DROP EJECTORS AND BLIND AS PER OPERATION BLIND LIST ➢ OFFER FOR INITIAL INSPECTION BY RELIBILITY ➢ HYDROJET CLEAN EJECTORS ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY FOR EJECTORS. ➢ PERFORM HYDROTEST FOR THE EJECTORS ➢ PULL BLINDS, INSTALL EJECTORS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.

7	**CLEANING & INSPECTION INSPECT X-3301 AND ASSOCIATED LINES- JCP-0219: E-3306** ➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ OPEN MANWAY AND INSTALL AIR REMOVER ➢ ERECT SCAFFOLDING AS REQUIRED AND ARRANGE INTERNAL LIGHTING. ➢ OFFER FOR INITIAL INSPECTION TO PROCESS ENGINEERING AND RELIABILITY. ➢ HYDROJECT CLEANING OF X-3301 AND ASSOCIATED LINES AS PER HIGHLIGHTED DRAWING. ➢ CLEAN FLANGE FACE AND OFFER FOR INSPECTION BY RELIABILITY ➢ POST CLEANING INSPECTION FOR X-3301 AND ASSOCIATED LINES BY RELBILITY AND PROCESS ENGINEERING. ➢ ULTRASONIC THICKNESS MEASUREMENTS BY RELIABILTY FOR THE 120” LINE. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ REMOVE INTERNAL LIGHTING AND SCAFFOLDING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING. ➢ BOX UP MANWAY AND APPLY TORQUE AS REQUIRED	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.
8	**FIN FAN HEADER LINE CLEANING- JCP-0425: E-3306** ➢ OPEN 24” MANWAYS (13 NOS.) ON INLET AND OUTLET PIPING HEADER SIZE 120",60", 102" AND LEVEL BOOTS, ➢ DISCONNECT ALL ASSOCIATE PIPING, ➢ PROVIDE AIR MOVER FOR INTERNAL OCCUPATION. ➢ ERECT SCAFFOLDING AS REQUIRED AND ARRANGE INTERNAL LIGHTING. ➢ PROVIDE FILTERING MESH TO AVOID ANY POLYMERS ENTERING INSIDE BOOT DRAIN PIPING. ➢ OFFER FOR INITIAL INSPECTION TO OPERATIONS, PROCESS ENGINEERING AND RELIABILITY. ➢ HYDRO JET CLEAN ON HEADER, LEVEL TAPINGS AND ASSOCIATED PIPING AND CONNECTIONS ➢ OFFER FOR POST CLEANING INSPECTION INLET AND OUTLET PIPING HEADER TO PROCESS ENGINEERING AND RELIBILITY. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY / PROCESS ENGINEERING. ➢ REMOVE INTERNAL LIGHTING AND SCAFFOLDING. ➢ FINAL INSPECTION BY RELIABILITY/ PROCESS ENGINEERING.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.

	➢ BOX UP ALL MANWAY AND APPLY TORQUE AS REQUIRED	
9	**CLEANING P-3356 A/B SUCTION LINE FROM C-3353: JCP-1918: C-3353** ➢ BLIND AS PER OPERATION BLIND LIST. ➢ COORDINATE TO DISCONNECT INSTRUMENT CONNECTIONS. ➢ DROP GATE VALVES, INSTRUMENT TW/FE/PG AS PER THE MARK UP P&ID'S ➢ OFFER FOR INITIAL INSPECTION / BOROSCOPE INSPECTION BY OPERATIONS, RELIBAILTY AND PROCESS ENGINEER ➢ HYDROJET CLEAN ALL PIPING LINE AS PER THE MARK UP P&IDS'. ➢ PUMP STRANERS REMOVAL, CLEANINNG, INSPECTION AND INSTALATION. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ POST CLEANING INSPECTION BY RELIABILTY, PROCESS ENGINEERING AND OPERATIONS. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ OFFER FOR FINAL INSPECTION FOR WELDING ACTIVITIES BY RELIABILTY. ➢ ALIGMENT CHECK FOR PUMP PIPING CONNECTION WITH S-CHEM ROTATING. ➢ INSTALL AND BOX UP GATE VALVES, INSTRUMENT TW/FE/PG AS PER THE MARK UP P&ID'S AND APPLY TORQUE AS REQUIRED. ➢ COORDINATE TO RE-CONNECT INSTRUMENT CONNECTIONS. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ DPT / UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ WELDING ACTIVITIES.

2.10 **PIPE CLEANING, INSPECTION AND HOT WORK SCOPE OF WORK:**

Perform Inspection and cleaning with cutting and welding of pipe as per specified in detailed scope given below, but are not limited to the following:

UNIT 33

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**CLEANING SUCTION & DISCHARGE PIPING OF P-3302A/B- JCP-0424: D-3303**	

	➢ BLIND AS PER OPERATION BLIND LIST. ➢ COORDINATE TO DISCONNECT INSTRUMENT CONNECTIONS. ➢ DROP GATE VALVES, NRV'S, PIPIG SPOOLS, PRESSURE GAUGE AS PER THE MARK UP P&ID'S ➢ OFFER FOR INITIAL INSPECTION / BOROSCOPE INSPECTION BY OPERATIONS, RELIBAILTY AND PROCESS ENGINEER ➢ COLD CUTTING OF PIPING SPOOLS AND DROP AS PER MARK UP P&ID'S ➢ HYDROJET CLEAN ALL PIPING LINE AS PER THE MARK UP P&IDS' ➢ PUMP STRANERS REMOVAL, CLEANINNG, INSPECTION AND INSTALATION. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ POST CLEANING INSPECTION BY RELIABILTY, PROCESS ENGINEERING AND OPERATIONS. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ **PREPARE FOR WELDING ACTIVITIES FOR PIPE SPOOLS FOR THE COLD CUT JOINTS DONE FOR CLEANING.** ➢ BEVEL PREPARATION FOR PIPE JOINT. ➢ BEVEL JOINT DPT ➢ FIT UP PIPE SPOOLS JOINTS ➢ WELDING AND NDT (DPT, RT AND HYDRO TEST) AS PER THE RIR. ➢ OFFER FOR FINAL INSPECTION FOR WELDING ACTIVITIES BY RELIABILTY. ➢ ALIGMENT CHECK FOR PUMP PIPING CONNECTION WITH S-CHEM ROTATING. ➢ INSTALL AND BOX UP GATE VALVES, NRV'S, PIPIG SPOOLS, PRESSURE GAUGE AS PER THE MARK UP P&ID'S AND APPLY TORQUE AS REQUIRED. ➢ COORDINATE TO RE-CONNECT INSTRUMENT CONNECTIONS. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED. **NOTE:** **1) COLD CUTTING, WELDING AND NDT (DPT, RT AND HYDRO TEST) UNDER CONTRACTOR SCOPE.**	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK. ➢ **PRE-FABRICATION OF PIPE SPOOLS.**
2	**<u>CLEANING SUCTION & DISCHARGE PIPING OF P-3301A/B- JCP-0426: D-3302</u>** ➢ BLIND AS PER OPERATION BLIND LIST. ➢ COORDINATE TO DISCONNECT INSTRUMENT CONNECTIONS. ➢ DROP GATE VALVES, CONTROL VALVE, FE, NRV'S, PIPIG SPOOLS, PRESSURE GAUGE AS PER THE MARK UP P&ID'S ➢ OFFER FOR INITIAL INSPECTION / BOROSCOPE INSPECTION BY OPERATIONS, RELIBAILTY AND PROCESS ENGINEER	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD

	➢ COLD CUTTING OF PIPING SPOOLS AND DROP AS PER MARK UP P&ID'S ➢ HYDROJET CLEAN ALL PIPING LINE AS PER THE MARK UP P&IDS' ➢ PUMP STRANERS REMOVAL, CLEANINNG, INSPECTION AND INSTALATION. ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ POST CLEANING INSPECTION BY RELIABILTY, PROCESS ENGINEERING AND OPERATIONS. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION. ➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ **PREPARE FOR WELDING ACTIVITIES FOR PIPE SPOOLS FOR THE COLD CUT JOINTS DONE FOR CLEANING.** ➢ BEVEL PREPARATION FOR PIPE JOINT. ➢ BEVEL JOINT DPT ➢ FIT UP PIPE SPOOLS JOINTS ➢ WELDING AND NDT (DPT, RT AND HYDRO TEST) AS PER THE RIR. ➢ OFFER FOR FINAL INSPECTION FOR WELDING ACTIVITIES BY RELIABILTY. ➢ ALIGMENT CHECK FOR PUMP PIPING CONNECTION WITH S-CHEM ROTATING. ➢ INSTALL AND BOX UP GATE VALVES, CONTROL VALVE, FE, NRV'S, PIPIG SPOOLS, PRESSURE GAUGE AS PER THE MARK UP P&ID'S AND APPLY TORQUE AS REQUIRED. ➢ COORDINATE TO RE-CONNECT INSTRUMENT CONNECTIONS. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED. **NOTE:** **1) COLD CUTTING, WELDING AND NDT (DPT, RT AND HYDRO TEST) UNDER CONTRACTOR SCOPE.**	WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ UTT / SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK. ➢ **PRE-FABRICATION OF PIPE SPOOLS.**
3	**<u>CLEANING REBOILER DRAIN LINES- JCP-0781: E-3351 A & JCP-0782: E-3351 B</u>** ➢ BLIND AS PER OPERATION BLIND LIST. ➢ COORDINATE TO DISCONNECT INSTRUMENT CONNECTIONS. ➢ DROP GATE VALVES AS PER THE MARK UP P&ID'S ➢ OFFER FOR INITIAL INSPECTION / BOROSCOPE INSPECTION BY OPERATIONS, RELIBAILTY AND PROCESS ENGINEER ➢ COLD CUTTING OF PIPING SPOOLS AND DROP AS PER MARK UP P&ID'S ➢ HYDROJET CLEAN ALL PIPING LINE AS PER THE MARK UP P&IDS' ➢ BOLTS AND GASKET SURFACE PREPARATION ➢ POST CLEANING INSPECTION BY RELIABILTY, PROCESS ENGINEERING AND OPERATIONS. ➢ COORDINATE WITH RELIABILITY AND PROCESS ENGINEERING FOR BORESCOPE INSPECTION.	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION,

	➢ COMPLETE INSPECTION RECOMMENDATION AS PER RELIABILITY. ➢ **PREPARE FOR WELDING ACTIVITIES FOR PIPE SPOOLS FOR THE COLD CUT JOINTS DONE FOR CLEANING.** ➢ BEVEL PREPARATION FOR PIPE JOINT. ➢ BEVEL JOINT DPT ➢ FIT UP PIPE SPOOLS JOINTS ➢ WELDING AND NDT (DPT, RT AND HYDRO TEST) AS PER THE RIR. ➢ OFFER FOR FINAL INSPECTION FOR WELDING ACTIVITIES BY RELIABILTY. ➢ INSTALL AND BOX UP GATE VALVES AS PER THE MARK UP P&ID'S AND APPLY TORQUE AS REQUIRED. ➢ COORDINATE TO RE-CONNECT INSTRUMENT CONNECTIONS. ➢ PULL BLINDS AND APPLY TORQUE AS REQUIRED. **NOTE:** **1) COLD CUTTING, WELDING AND NDT (DPT, RT AND HYDRO TEST) UNDER CONTRACTOR SCOPE.**	➢ UTT / SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK. ➢ **PRE-FABRICATION OF PIPE SPOOLS.**
4	**<u>K-3301 ABC LINE CLEANING, INSPECTION AND REPLACEMENT</u>** **<u>JCP-0937, JCP-0938, JCP-0939, JCP-0940</u>** ➢ LOCK ALL SPRING HANGERS. ➢ INSTALL BLINDS AS PER OPERATION BLIND LIST ➢ DISCONNECT INSTRUMENTS / ELECTRIC TRACING AS REQUIRED. ➢ OPEN HAND HOLE FOR SUCTION AND DISCHARGE SILENCERS OF K-3301A, K-3301B AND K-3301C ➢ DROP SUCTION STRAINERS, VALVES, PIPE SPOOLS (SUCTION LINE P-33052-36"-XA1PB-AC51-NT D-3304 TO K-3301A– P&ID DWG# JCP-33-P1-EF-025 & DWG# JCP-33-P1-EF-023) (SUCTION LINE P-33053-36"-XA1PB-AC51-NT D-3304 TO K-3301B– P&ID DWG# JCP-33-P1-EF-027 & DWG# JCP-33-P1-EF-023) (SUCTION LINE P-33054-36"-XA1PB-AC51-NT D-3304 TO K-3301B – P&ID DWG# JCP-33-P1-EF-029 & DWG# JCP-33-P1-EF-023) ➢ DROP DISCHARGE STRAINERS / PIPE SPOOLS / VALVES / DIAPRAM VALVES. (DISCHARGE LINE P-33059-14"-E-AC-ET K-3301A TO E-3309 HEADER – P&ID DWG# JCP-33-P1-EF-025 & DWG# JCP-33-P1-EF-031). (DISCHARGE LINE P-33061-14"-E-AC-ET K-3301B TO E-3309 HEADER– P&ID DWG# JCP-33-P1-EF-025 & DWG# JCP-33-P1-EF-031). (DISCHARGE LINE P-33062-14"-E-AC-ET K-3301C TO E-3309 HEADER – P&ID DWG# JCP-33-P1-EF-025 & DWG# JCP-33-P1-EF-031). ➢ REMOVE (K-3301A, K-3301B AND K-3301C) DISCHARGE CHECK VALVE FROM K-3301A, K-	➢ ISOLATION AND DECONTAMINATION OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK. ➢ INSTRUMENT AND ELECTRICAL DISCONNECTION AND CONNECTIONS. ➢ **PRE-FABRICATION OF PIPE SPOOLS.**

	3301B AND K-3301C. ➢ PRELIMINARY INSPECTION BY PROCESS ENGINEERING AND OPERATIONS. ➢ HYDRO JET CLEAN THE NRV'S AND SHIFT TO DESIGNATED AREA INSIDE COMPANY FACILITY LAY DOWN YARD/TURNAROUND WAREHOUSE WHICH WILL BE SEND FOR OUTSIDE SHOP. ➢ HYDRO JET CLEANING ALL PIPES/STRAINERS/SPOOL FOR 14" PIPING AS PER P&ID'S FOR K-3301 A, B, C AND AIR BLOW ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY AND PROCESSING ENGINEERING. ********** ******REPLACEMENT OF DISCHARGE PIPING 14", 20" & 24", CONNECTING TO E-3309 AND K-3301 – HOT WORK, JCP-0940** ➢ COLD CUTTING, BEVELING, FIT-UP, WELDING AND NDT (DPT, RT, HYDRO TEST AS PER RIR) TO REPLACE DISCHARGE PIPING 14" 20" & 24" CONNECTING TO E-3309 K-3301 AS PER HIGHLIGHTED DRAWING SHALL BE UNDER CONTRACTOR SCOPE. ➢ PRE-FABRICATION & PAINTING SHALL BE UNDER S-CHEM. ********** ➢ AFTER OUTSIDE SHOP WORK FOR NRV'S, COLLECT THE NRV'S FROM LAY DOWN YARD/TURNAROUND WAREHOUSE AND SHIFT TO LOCATION. ➢ RE-INSTALL AND TORQUE INLET & OUTLET PIPE SPOOLS/ STRAINERS /INLET & OUTLET VALVE/ CHECK VALVE / DIAPRAM VALVES FOR K-3301 A, B AND C. ➢ RECONNECT INSTRUMENTS/ELECTRIC TRACINGS. ➢ REMOVE BLINDS AND TORQUE. ➢ UNLOCK ALL SPRING HANGERS. **NOTE:** ➢ **COLD CUTTING, WELDING AND NDT (DPT, RT AND HYDRO TEST) UNDER CONTRACTOR SCOPE.**	

2.11 SUCTION SILENCER OF COMPRESSOR K-3301A SCOPE OF WORK:

UNIT 33

RESPONSIBILITY MATRIX		
S #	**CONTRACTOR**	**S-CHEM**
1	**REMOVAL AND INSTALLATION OF SUCTION SILENCER OF COMPRESSOR K-3301A: AWR# 211** ➢ LOCK SPRING HANGERS.	➢ ISOLATION AND DECONTAMINATION

	➢ UNBOLT AND REMOVE SUCTION SILENCER X-3308A FROM COMPRESSOR K-3301 A. ➢ INITIAL INSPECTION BY RELIBILITY AND ROTATING. ➢ CLEAN SUCTION SILENCER X-3308A ➢ BOLTS AND GASKET SURFACE PREPARATION. ➢ OFFER FOR POST CLEANING INSPECTION BY RELIBILITY AND ROTATING. ➢ AFTER INSTALLATION OF COMPRESSOR K-3301A, INSTALL SUCTION SILENCER X-3308A. ➢ ALIGMENT CHECK WITH S-CHEM ROTATING. ➢ BOX UP AND TORQUE AS REQUIRED. ➢ UNLOCK SPRING HANGERS. **NOTE:** **1) CRANE WITH OPERATOR SHALL BE PROVIDED BY S-CHEM.** **2) RIGGERS, LIFT PLAN AND LIFTING TOOLS SHALL BE PROVIDED BY CONTRACTOR.** **3) CONTRACTOR SHALL EVALAUTE AND PROVIDE THE REQUIRED CRANE CAPACITY TO ARRANGE BY S-CHEM FOR SILENCER REMOVAL AND INSTALLATION.**	OF EQUIPMENT/SYSTEM. (S-CHEM WILL PROVIDE ALL NECESSARY HARD PIPING FOR FACILITATE THE DECONTAMINATION WORKS) ➢ SYESTEM BLINDING AND COMMON BLINDING WHICH INTERPRETED WITH OTHERS. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, INTERNAL AND EXTERNAL LIGHTING ➢ SCAFFOLDING (INTERNAL AND OUTSIDE). ➢ INSULATION REMOVAL & REINSTALLATION, ➢ UTT, SEE SNAKE / BORESCOPE INSPECTION. ➢ PAINTING WORK AND WELDING ACTIVITIES. ➢ CRANE WITH OPERATOR.

2.12 **BLINDING AND DEBLINDING SCOPE OF WORK:**

Perform Blinding and De-blinding Works as per specified in detailed scope given below, but are not limited to the following:

RESPONSIBILIT	
CONTRAC	**S-CHEM**
➢ CONTRACTOR SHALL VERIFY THE LTT. ➢ INSTALL BLIND AS PER BLIND LIST. ➢ REMOVE BLIND AS PER BLIND LIST. **NOTE:** THE LIST OF EQUIPMENT WHICH REQUIRE BLINDING AND DE- BLINDING ARE LISTED BELOW WITH BLIND DETAILS.	➢ DECONTAMINATION AND ISOLATION OF SYSTEM/EQUIPMENT. ➢ PROVIDE DRAWINGS, MATERIALS, HARD WARES, BLINDS, AND GASKETS. ➢ PROVIDE ALL UTILITIES SUCH AS WATER, EXTERNAL LIGHTING. ➢ SCAFFOLDING (ERECTION & DISMATLLING) AND INSULATION (REMOVAL & REINSTALLATION). ➢ BLINDS, GASKET AND BOLTS.

SL #	**EQUIPMENT NO**	**BLINDING & DEBLINDING DETAILS**		
		SIZE	**RATTINGS#**	**QTY**
1	**Battery Limit-Process**	**6"**	**300**	**1**
		6"	**300**	**1**
		4"	**600**	**1**

		10"	**300**	**1**
		2"	**300**	**1**
		6"	**150**	**1**
		2"	**300**	**1**
		2"	**600**	**1**
		6"	**300**	**1**
		2"	**600**	**1**
		2"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		1"	**600**	**1**
		1"	**600**	**1**
		1"	**300**	**1**
		1"	**300**	**1**
		.75"	**600**	**1**
		1"	**600**	**1**
2	**Battery Limit-Utilities**	**6"**	**150**	**1**
		10"	**150**	**1**
		8"	**300**	**1**
		20"	**600**	**1**
		24"	**150**	**1**
		2"	**150**	**1**
		2"	**300**	**1**
		2"	**150**	**1**
		3"	**600**	**1**

2.13 **DECOMMISSION AND COMMISSION SUPPORT:**

CONTRACTOR to support COMPANY maintenance for decommissioning & commissioning activities by providing the below mentioned manpower.

UNIT 32

- **Decommissioning:**

Craft	Tentative Quantity	Tentative Day's
Pipe fitter	8 (4 day / 4 Night)	14
Pipe fitter (BA Qualified)	4 (2 day / 2 Night)	14

- **Commissioning:**

Craft	Tentative Quantity	Tentative Day's
Pipe fitter	8 (4 day / 4 Night)	14
Pipe fitter (BA Qualified)	4 (2 day / 2 Night)	14

Quantity is tentative & Invoicing shall be done on time sheets based on actual site requirement.

UNIT 33

- **Decommissioning:**

Craft	Tentative Quantity	Tentative Day's
Pipe fitter	8 (4 day / 4 Night)	14
Pipe fitter (BA Qualified)	4 (2 day / 2 Night)	14
Foreman/Permit receiver	2 (1 day / 1 Night)	14
Breathing Apparatus complete set	1 (24 hours)	14

- **Commissioning:**

Craft	Tentative Quantity	Tentative Day's
Pipe fitter	8 (4 day / 4 Night)	14
Pipe fitter (BA Qualified)	4 (2 day / 2 Night)	14
Foreman/Permit receiver	2 (1 day / 1 Night)	14
Breathing Apparatus complete set	1 (24 hours)	14

Quantity is tentative & Invoicing shall be done on time sheets based on actual site requirement.

2.14 **UNDEFINED JOBS:**

RESPONSIBILITY MATRIX

S.NO	CONTRACTOR		TERMS & CONDITIONS
	JOB DESCRIPTION	SPECIFICATION	➢ Contractor shall provide detailed proposal for each size individually. ➢ Contractor shall not submit the proposal by Time and Material basis, and it should be for unit rate. ➢ Contractor shall submit hourly unit rates for usage of Crane, Forklift or any other equipment used for facilitating the work. ➢ COMPANY will provide blind, Gasket, fastener, or any other hardware that required for complete the work.
1	Steam Hose Connection	1" to 3"	
2	Utility Hose Connection (water/Air, N2)	1/2” to 3”	
3	Blinding/De-blinding with Breathing Apparatus	1/2" x 150 psi to 60" x 150 psi	
4	Blinding/De-blinding with Breathing Apparatus	1/2" x 300 psi to 60" x 300 psi	
5	Blinding/De-blinding	1/2" x 150 psi to 60" x 150 psi	
6	Blinding/De-blinding	1/2" x 300 psi to 60" x 300 psi	
7	Gasket Replacement	½” x 150 psi to 60” x 150 psi	
8	Gasket Replacement	½” x 300 psi to 60” x 300 psi	
9	Replace screwed Valves	¾” x 150 psi to 1 ½” 150 psi	
10	Replace screwed Valves	¾” x 300 psi to 1 ½” 300 psi	
11	Replace Flanged Valves	¾” x 150 psi to 54” x 150 psi	
12	Replace Flanged Valves	¾” x 300 psi to 54” x 300 psi	
13	Replace Flanged PRD Valves	¾” x 150 psi to 24” x 150 psi	
14	Replace Flanged PRD Valves	¾” x 300 psi to 24” x 300 psi	

2.15 **TENTATIVE WORK SCHEDULE:**

2.15.1 TA Shutdown Down commencement start date (tentatively) – 7th Jan’ 2024. Tentative system wise Maintenance

window provided with respect to Equipment's. However, CONTRACTOR shall follow the COMPANY level 3 schedule provided to CONTRACTOR.

3 DRAWINGS, SPECIFICATIONS & PROCEDURES

Specifications, standards, procedures, drawings and Company's General Instructions shall apply to Engineering and construction works when applicable. All above documents shall be collected from Turnaround Planning Section after having NDA signed with COMPANY.

4 GUIDELINES

4.1 All work should follow COMPANY Standards and Specifications.

4.2 All work outside the above codes, standards and specifications shall follow COMPANY guidelines and practices.

4.3 CONTRACTOR shall comply with COMPANY Policies, General Instructions and Work Procedures regarding the use of Personal Protective Equipment's (PPE).

4.4 CONTRACTOR shall comply with COMPANY Safety and Security program Exhibit III (more details can be sought out later by CONTRACTOR as applicable)

4.5 COMPANY may from time to time and at any time require CONTRACTOR to suspend performance hereunder completely or partially for whatever length of time COMPANY may elect. The time for completion shall be extended by each period that the completion date is necessarily delayed by (a) the actions or omissions of COMPANY or another independent contractor that is directly responsible to COMPANY (unless such delay is due to CONTRACTOR's actions or failures to act). In case COMPANY requires suspending the performance of work, CONTRACTOR shall be given reasonable delivery extensions.

4.6 CONTRACTOR shall provide a qualified safety officer when there is work in the Plant. This safety officer shall not do any other work, other than safety.

4.7 Anything not listed in the CONTRACTOR's offer / Exhibit – I, Scope of Work, but appearing on the drawings / attachments shall be completed by CONTRACTOR, with no additional charges.

4.8 CONTRACTOR should utilize COMPANY recommended sub-contractors / manufacturers, as per Exhibit I Scope of Work, Attachment -I.

4.9 CONTRACTOR shall ensure presence of their personnel to the designated work area only. Any Person found in or around unrelated plant area, shall be subject to immediate removal from Plant. CONTRACTOR shall provide a suitable replacement immediately to avoid any effect on work progress.

5.0 GENERAL REQUIREMENT

The Section 3.0 above shall prevail in the event of any inconsistency on the text hereunder.

5.1 COMPANY's REPRESENTATIVE

COMPANY will maintain, as required, a representative hereafter called the "COMPANY Representative". COMPANY Representative will provide liaison between COMPANY and CONTRACTOR and represent COMPANY in all matters covered by this Contract, including negotiating and approving changes.

COMPANY's Representative will be the only COMPANY employee authorized to represent COMPANY with respect to this Contract. Examples of his functions are to:

5.1.1 Review and approve designs, specifications, requisitions and purchase orders as required by this Contract.

5.1.2 Establish and maintain field liaison between CONTRACTOR's Representative and COMPANY.

5.1.3 Review CONTRACTOR's construction schedule and field performance.

5.1.4 Make such inspections of the Facility during construction, as COMPANY may desire in order to check the progress of the Work and quality of workmanship and Materials.

5.1.5 Negotiate and approve field changes.

5.1.6 Review CONTRACTOR's administrative procedures.

5.1.7 If, in COMPANY's considered opinion, the conduct or performance of any of CONTRACTOR's personnel is unsatisfactory in any way, CONTRACTOR, if COMPANY so requests, shall at CONTRACTOR's sole cost and expense promptly replace such person or persons with personnel suitably qualified.

At the start of Work, CONTRACTOR shall develop procedures for handling correspondence, Material orders, quotation

analyses, drawings, schedules and other administrative or engineering aspects of Work to the satisfaction of COMPANY.

5.2 CONTRACTOR's PERSONNEL

CONTRACTOR shall assign a full-time Project Manager (hereafter called "CONTRACTOR Representative") to provide liaison between CONTRACTOR and COMPANY and to represent CONTRACTOR in all matters covered by this Contract, including negotiating and approving COMPANY's authorized changes. The CONTRACTOR's Representative shall not be changed during the course of the Work unless COMPANY approves such change in writing.

When fieldwork is in progress CONTRACTOR's Representative shall act in full charge of CONTRACTOR's fieldwork and maintain field liaison between CONTRACTOR and COMPANY's Representatives. Examples of his functions are to:

5.2.1 Negotiate and approve for CONTRACTOR, COMPANY's field changes authorized by COMPANY.

5.2.2 Represent CONTRACTOR in matters pertaining to construction performance and quality, scheduling, administrative procedures and financial controls

5.2.3 Represent CONTRACTOR during all required tests.

5.2.4 Coordinate with COMPANY Project Engineer on all job activities

5.2.5 Remove any person from CONTRACTOR staff in case the same is not fully complying with the COMPANY requirements or when requested by COMPANY Representative and shall provide a suitable replacement within a week time and without affecting the work progress.

5.3 KEY PERSONNEL

CONTRACTOR shall maintain the following persons at the job site on a full-time basis at all times during the course of the Work and shall not remove or reassign such personnel without COMPANY's prior approval:

a. CONTRACTOR's Project Manager
b. Safety Engineer
c. Quality Control Engineer.
d. Work Permit Receiver
e. Direct working resources and staff.

5.4 SPECIAL TOOLS FOR EQUIPMENT INSTALLATION

All special tools and/or equipment required for installation and/or maintenance of equipment shall be furnished by CONTRACTOR.

5.5 WORK PERMITS

At least thirty (30) days prior to mobilization, CONTRACTOR shall familiarize himself with COMPANY's Plant Operations and Maintenance Work Permit procedures and CONRACTOR's workers shall be trained to receive Work Permits in a timely manner. After approval by COMPANY, CONTRACTOR shall comply with this Work Permit procedure. COMPANY will not be responsible for delays due to CONTRACTOR's failure to submit its Work Permits in a timely fashion or failure to comply with the approved Work Permit procedure.

5.6 FIELD INSPECTION

5.6.1 Inspection by COMPANY

COMPANY may visit and inspect any and all of the Work and Materials at any time, and CONTRACTOR shall provide safe and proper facilities therefor. CONTRACTOR shall at all times during the performance of the Work keep a competent supervisor, fluent in the English language, in the immediate vicinity of the Work areas to receive communications from COMPANY and to supervise the performance of this Contract.

COMPANY shall inspect all works and witness all tests. Prior notice shall be given to COMPANY for any inspection or witnessing as:

a. THREE (03) working days for inside the COMPANY facility.

b. FOURTEEN (14) working days for outside the COMPANY facility.

c. Testing requirements shall be based on COMPANY inputs.

d. CONTRACTOR to determine hold points for inspection and test witnessing.

e. COMPANY reserves the right to assign any 3rd party inspection agency, as needed.

5.6.2 CONTRACTOR's Inspection Responsibility

CONTRACTOR shall be solely responsible for thorough inspection and testing of the Work and for the quality of the Work. COMPANY's inspection of, testing of, approval of, or agreement to the performance of any part of the Work shall in no way relieve CONTRACTOR of its responsibility for the Work. CONTRACTOR shall:

5.6.2.1 Submit Inspection Testing Plan for COMPANY review and comments.

5.6.2.2 Welders must be tested & certified by COMPANY, in order to avoid re-do jobs & only those qualified welders to work on this project.

5.6.2.3 In case of HDPE fusion welding CONTRACTOR must be qualified by COMPANY for both the machine and operator.

5.6.2.4 For NDT related works the interpretation must be done by qualified independent level 2 or 3 person.

5.6.2.5 Must submit their QA/QC for review and approval including Welding Procedure & Specification (WPS) & Project Quality Records (PQR's) prior to awarding of contract.

5.6.3 Inspection by CONTRACTOR

Whenever any part of CONTRACTOR's Work depends on existing work or work or Material provided by COMPANY or others, CONTRACTOR shall inspect and measure such other work or Material and promptly notify COMPANY of each defect or discrepancy in such other work or Material that may render it unsuitable for proper execution of CONTRACTOR's Work or proper functioning of the Facility. If CONTRACTOR fails to notify COMPANY's Representative of any such defect or discrepancy before performing CONTRACTOR's independent Work, and such defect or discrepancy would have been discovered in the course of a reasonably thorough visual inspection and measurement, COMPANY may condemn the Work or Material involved and CONTRACTOR shall correct such defect or discrepancy on the same basis as if it were defective Work by CONTRACTOR as per General Terms and Conditions (copy attached).

5.7 COMPLETION

5.7.1 Mechanical Completion

CONTRACTOR shall cause Mechanical Completion of the Facility to occur. Mechanical Completion shall mean that all requirements of this Contract have been met with respect to:

5.7.1.1 Construction
5.7.1.2 Safety
5.7.1.3 Ability to physically operate.

Prior to Mechanical Completion, CONTRACTOR shall demonstrate to COMPANY all portions of the facility:

- have been built according to the terms of this contract.
- operate as intended.

5.7.2 Acceptance by COMPANY

All Work will be subject to Acceptance by COMPANY pursuant this Exhibit–I Scope of Work

5.8 TIME FOR COMPLETION

5.8.1 Initial Time for Completion

CONTRACTOR shall cause the Facility to achieve Mechanical Completion, on or before the applicable date specified in the contract. The time for completion shall be extended only in accordance with the provisions of the Terms and Conditions. COMPANY shall reduce the time for completion only with the written consent of CONTRACTOR.

5.8.2 Failure to Maintain Schedule

If at any time during the progress of the Work, CONTRACTOR's actual progress is inadequate to meet the approved schedule and as established, COMPANY shall have the right, but not the obligation, to so notify CONTRACTOR who shall thereupon take such steps as may be necessary to remedy the inadequacy. If within a reasonable period (as determined by COMPANY and not to exceed THREE (03) working days) CONTRACTOR does not improve performance to meet the schedule, COMPANY may require an increase in labor force, number of shifts, overtime operations, or additional days of work per week without additional compensation to CONTRACTOR, to eliminate or reduce the possibility of delayed completion. COMPANY may make such requirements in addition to any other rights or remedies that COMPANY may have.

5.8.3 Failure to Complete on Schedule

If CONTRACTOR does not cause the Facility to achieve Mechanical Completion within the time, COMPANY may elect to take over and complete the Work pursuant to the Terms and Conditions. COMPANY may take over and complete the Work in addition to any other rights or remedies that COMPANY may have.

6.0 MATERIALS, SERVICES AND UTILITIES FURNISHED BY COMPANY

COMPANY shall furnish or cause to be furnished to CONTRACTOR, the following items for or in connection with performance of the Work.

6.1 **COMPANY** shall provide: Please refer clause no. 1.2, 2.1, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9,2.10, 2.12,2.13,2.14 (Responsibility matrix COMPANY) & 3

6.2 In addition to Clause no. 1.1, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.12,2.13,2.14 (Responsibility matrix CONTRACTOR) CONTRACTOR should provide.

6.2.1 Providing a Level –II T/A schedule showing start date, sequence of activities, end date, crew sizes and craft mix. All work is to be planned and scheduled to complete as soon as possible. After award of PO contractor will submit detailed plan in Primavera

6.2.2 Arranging receipt and transfer of all non-consumable material from the COMPANY T/A Warehouse to the work location. CONTRACTOR will return the balance of unused and undamaged material to the T/A warehouse after completion of work.

6.2.3 Supplying all qualified labor, supervision, tools, equipment, technical support, consumables, expendables, and temporary supplies necessary for, and reasonably incidental to complete Repair & Cleaning of Columns

6.2.4 Providing necessary consumable and expendable supplies in sufficient quality and quantity for personnel to perform the scope of work safely and efficiently.

6.2.5 Providing, Breathing Apparatus for blinding, Air compressor, Certified & Tested Lifting & Pulling tools and tackles, Calibrated Pressure gauges, Test equipment, Safety Device, chemical hoses Hand Tools & Power Tools etc. These should meet or exceed COMPANY relevant GI’s.

6.2.6 Blind lists provided in bidding package are tentative for estimation purpose. Blinding at site to be done as per Operations Blind list provided with marked up PID's. These lists will be provided at later stage after award of PO.

6.2.7 Provide forklifts and qualified forklift operators holding valid Saudi driving license. Forklift operators are required to attend COMPANY Powered Industrial Truck (PIT) training per COMPANY General Instruction. CONTRACTOR will schedule personnel for pre-T/A PIT training at the request and timing specified by COMPANY T/A management.

7.0 REPORTING REQUIREMENTS

7.1 CONTRACT DAILY REPORT

CONTRACTOR shall submit progress reports at end of each shift which provide manpower (including manual, non-manual and sub-contractors) present for work, a listing of all equipment on site (detailed by type and quantity), and any Safety related issues. Reports shall be submitted in the format established with continuation pages on forms proposed by CONTRACTOR and acceptable to the COMPANY Representative.

7.2 DAILY PROGRESS REPORT

CONTRACTOR shall submit a written daily progress report, which will cover daily field work. The report shall summarize the status of job and the overall progress achieved for the CONTRACTOR's detailed work schedule.

8.0 DATA REQUIREMENTS

After completion of turnaround contractor will submit detailed report. This report will contain technical details, manpower & logistic details.

9.0 QUALITY CONTROL REQUIREMENTS

9.1 QUALITY PLAN

9.1.1 CONTRACTOR shall provide a comprehensive; project specific Quality Plan that identifies CONTRACTOR's procedures for Quality Control during the Construction execution phase of the Work. The Quality Plan shall be presented to COMPANY for approval at least 45 days prior to beginning turnaround. After approval by COMPANY, CONTRACTOR shall comply with requirements of the Quality Plan.

9.1.2 Should any inspection or test reveal any defect in CONTRACTOR supplied materials or in CONTRACTOR's Work, CONTRACTOR shall correct such defect at no cost to COMPANY.

9.1.3 Hydro test of all piping shall be at in-service pressure of piping. All joints shall be exposed during hydro test. Hydro test plan shall be submitted with the Quality Plan.

9.1.4 Pipe should be cleaned thoroughly before fitment so that unwanted dust, etc should not be present.

9.1.5 Pipeline should be made ready for commissioning as per schedule, including testing, inspection, cleaning, etc.

9.1.6 CONTRACTOR shall also assist in the commissioning and startup of the line.

9.2 QUALITY INCHARGE

CONTRACTOR shall provide a full-time QC who shall be responsible for the coordination of CONTRACTOR's construction quality surveillance, inspection, testing, and documentation activities.

10.0 CONSTRUCTION

All Construction Access, Construction Methods, Temporary Facilities and Work Areas shall conform to and be in compliance with COMPANY Operations, Standard Industry requirements and where applicable Royal Commission for Jubail Construction Safety requirements.

10.1 Turnaround Execution Plan

CONTRACTOR shall develop and submit to COMPANY a detailed project specific turnaround Execution Plan at least 60 days prior to the start of turnaround.

10.2 Security Program

CONTRACTOR is responsible for the security of its workers, tools, materials and equipment (and to and from) the jobsite. All small tools and construction equipment belonging to CONTRACTOR must be clearly identified as such. Tools including personal tools are subject to inspection at the security gate upon arrival and departure.

10.3 Construction Area Limits

COMPANY shall designate the boundary limits of access roads, parking areas, storage areas, and construction areas. CONTRACTOR shall not trespass in or on areas not so designated. CONTRACTOR shall be responsible for keeping all of its personnel out of areas not designated for CONTRACTOR's use. In the case of isolated work located within such areas, CONTRACTOR shall obtain permits to enter and perform the Work. CONTRACTOR shall keep all vehicles, equipment, materials and personnel in such areas as designated by COMPANY.

10.4 CONTRACTORS Office at Site of Work

During the execution of this Contract, COMPANY will provide office for project manager & coordinator in separate or shared office building.

10.5 CONTRACTOR Supplied Temporary Buildings

Any CONTRACTOR supplied temporary construction buildings shall be fire retardant and shall include fire protection equipment. The location, size(s), quantity and type(s) of temporary buildings shall be subject to COMPANY's review and approval.

10.6 Personnel Identification

10.6.1 CONTRACTOR's personnel and Sub-contractor personnel shall have in their possession all required and properly validated licenses, certificates or identification badges prescribed by COMPANY or the Saudi Arabian Government.

10.6.2 CONTRACTOR shall wear and provide identification badges to all its employees working either directly or indirectly under its supervision. These badges must be worn conspicuously by these employees at all times when on the jobsite. CONTRACTOR shall provide Temporary badges and safety gear for visitors and delivery personnel.

10.7 Smoking

Smoking shall only be allowed in the designated smoking areas.

10.8 Dust Control

CONTRACTOR, for the duration of the Contract, shall maintain all excavations, embankments, haul roads, plant sites, waste disposal areas, borrow areas, and all other work areas free from dust, as determined by COMPANY. Industry-accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, tight bituminous treatment or similar

methods, with COMPANY approvals, will be permitted. No separate payment will be made for dust control.

10.9 Water Pollution

CONTRACTOR shall, at own expense, provide suitable facilities to prevent the introduction of any substances or materials into any stream, lake or other body of water which may pollute the water or constitute substances or materials deleterious to fish, wildlife and domestic stock.

10.10 Air Pollution

CONTRACTOR shall also perform the Work so as not to discharge into the atmosphere from any source whatever smoke, dust, or other air contaminants in violation of the laws, rules and regulations of the government entities having jurisdiction.

10.11 Fuels & Lubricant

CONTRACTOR shall be responsible for the proper handling, transportation, storage and use of fuels and lubricants and shall, at CONTRACTOR’s sole expense, make good any damage caused by its handling, transporting, storage and use of fuels and lubricants.

10.12 Ventilating

10.12.1 CONTRACTOR shall prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.

10.12.2 CONTRACTOR shall provide local ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

10.12.3 CONTRACTOR shall dispose of materials in manner that will not result in harmful exposure to persons or disrupt or otherwise effect operation of existing facilities.

10.12.4 CONTRACTOR shall ventilate storage spaces containing hazardous, volatile or high temperature sensitive materials.

10.13 Site Signs

Identification signboards and notices for safety or instruction are permitted on site only after approval of COMPANY for format, location and quantity.

10.14 Drainage

CONTRACTOR shall provide proper and adequate drainage for its construction, storage, parking and fabrication areas including the necessary piping for disposal to COMPANY ditches, or sewers. Temporary drainage facilities shall be removed upon completion of Work unless COMPANY directs to have the facilities left in place. CONTRACTOR shall be responsible for providing and operating any temporary pumps for keeping its area drained. CONTRACTOR shall furnish and place any necessary surfacing material to avoid loss of time due to muddy conditions.

10.15 Lunch and Toilet Facilities

Company shall provide necessary lunch and toilet facilities for CONTRACTOR personnel... CONTRACTOR shall provide meals to their manpower during breaks in lunch tent.

10.16 Construction Entrance

Access into COMPANY work site shall be through TA gate.

10.17 Review by COMPANY

Review and approval of CONTRACTOR’s rigging, scaffolding and other construction plans by COMPANY, shall not constitute or to be construed as an assumption of CONTRACTOR’s responsibility or liability for scaffolding or safety under the Contract or at law, and does not relieve CONTRACTOR from full compliance with its legal and contractual obligations.

10.18 Interference

It is understood that the COMPANY may itself perform Work at or near the CONTRACTOR’s Work site, or have such Work performed by others. CONTRACTOR agrees to cooperate fully with COMPANY or any other CONTRACTOR performing such Work, and not to interfere with the performance of such Work.

10.19 Site Clean Up

CONTRACTOR shall maintain the site in a safe and orderly condition by daily removal and disposal of accumulated rubbish and waste material. Temporary equipment shall be removed immediately upon completion of the WORK requiring the equipment. Upon completion of the Work, CONTRACTOR shall clear the site of all remaining CONTRACTOR's temporary facilities, temporary equipment, debris, tools, and material used in the Work. Where CONTRACTOR, upon written notice from the COMPANY, fails to maintain the site in a safe and orderly condition, the COMPANY will have the site maintenance Work performed and deduct the cost from the CONTRACTOR invoice.

10.20 Heavy lifts

CONTRACTOR shall provide a **heavy lift plan for all lifts over TEN (10) tons**, for COMPANY's review and approval.

11.0 ENVIRONMENTAL REQUIREMENTS

11.1 General Requirements

CONTRACTOR shall plan, execute and complete all work such that there are zero environmental incidents and no detrimental environmental impacts to the local population, workers, air, water, soil, plants and animals.

11.2 Environmental Care and Response Plan

CONTRACTOR shall submit a Project Specific Environmental Care and Response Plan in compliance with the Saudi Arabian Government, and Saudi Chevron Petrochemical Environmental Standards. The Environmental Plan shall provide specific plans and procedures to address compliance with these Standards and shall be submitted for COMPANY review prior to commencement of the Work.

11.3 Environmental Care Practices

CONTRACTOR shall perform the Work in accordance with all environmental care practices, applicable local and national rules, regulations and codes taking all reasonable precautions to protect the facility, adjacent facilities, workers and the public. CONTRACTOR shall have materials and equipment on site to minimize, control and mitigate incidences of uncontrolled releases of materials to the air, water or land.

11.4 Environmental Care Orientation Meeting

CONTRACTOR's in-Kingdom supervisory personnel, including supervisory personnel of CONTRACTOR subcontractors, shall attend an environmental care orientation meeting, prior to commencing the Work. This meeting shall last at least two (2) hours and shall be separate from any safety or security orientation.

COMPANY may, at its sole discretion, audit CONTRACTOR environmental care orientation meetings.

11.5 Accidents and spills

Accidents, spills, uncontrolled releases to air, water, and land or other environmental incidents and "near misses" shall be orally reported to COMPANY at the time of the incident. CONTRACTOR shall submit written reports, in a format developed with COMPANY, within twenty-four (24) hours after each incident. CONTRACTOR shall maintain a jobsite record of such environmental incidents and "near misses" which shall be submitted to COMPANY upon written request.

11.6 CONTRACTOR's Responsibility

CONTRACTOR shall be wholly responsible for construction means, methods, techniques, sequences or procedures for environmental precautions and programs in connection with the Work. COMPANY shall not, in any way, be responsible for CONTRACTOR's failure to employ such precautions.

END
EXHIBIT–I